MGH News

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Comparing Tools Used to Combat Paralyzing Fear

Asking Investigators Some Tough Questions

A researcher wants to try a newly developed type of X ray.

In searching for a better diagnostic test for cancer, another investigator wishes to draw small samples of patients' blood.

A physician wants to evaluate a new drug in patients. It has been tested elsewhere, but doctors know little about its effects.

These are hypothetical examples, typical of much medical research which is carried out in the United States. Each study may sow the seeds of an important discovery.

But what about the rights and welfare of the people undergoing the studies? Who will ensure that the new X ray does not endanger the person's health? How will the cancer investigator prevent the blood-test results from falling into the wrong hands, perhaps with embarrassing or even harmful results? Will the new drug expose the patients to risks which outweigh its potential benefits?

During the 1950s and early 1960s, such questions increasingly troubled American scientists, physicians, philosophers, government officials, and others. The subject inspired a growing stream of writings and speeches.

From the MGH, Dr. Henry K. Beecher, then Chief of the Anesthesia Service, made major contributions to the national discussion. Like many, he believed that some American scientists were compromising the unprotected rights and welfare of their subjects. Unlike most, he pronounced his views with a boldness and candor which attracted a national audience.

In September 1965, the MGH Committee on Research recommended that the hospital establish a special group to review any human research carried out at the institution. During that fall the Subcommittee on Human Studies held its first meeting.

In the following February the Surgeon General of the U.S. Public Health Service (U.S.P.H.S.) issued new regulations on the conduct of research involving humans. From then on the

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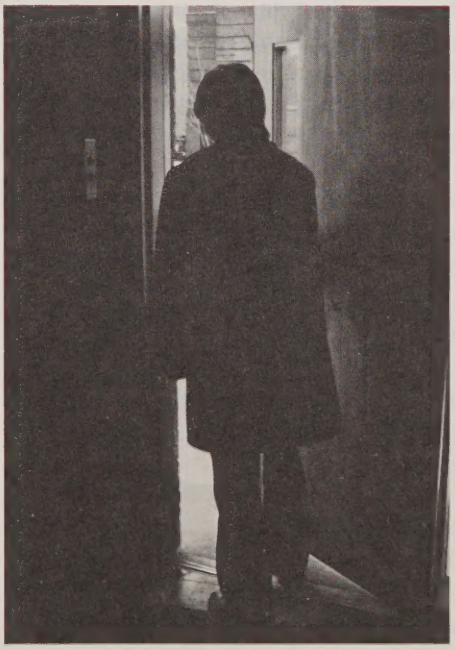

To venture out or not? Generalized anxiety can confine a phobic person to his home for decades.

Until last summer, fear ruled the life of a 38-year-old Boston woman.

For 25 years she had been afraid even to step out the front door of her home unless accompanied by her mother. Out alone, she would suffer attacks of panic – spontaneous, unexplained, and uncontrollable episodes of terror.

Last spring and summer, however, her horizons gradually expanded. She went shopping alone. She attended her son's high-school graduation in another part of town. For the first time since her early teens, she accompanied her family to the beach. Later she began exploring other communities by herself.

The turning point came when she volunteered to participate in a study conducted by a team of MGH psychiatrists. In one of the first projects of its kind, they are evaluating the relative effectiveness of two types of antidepressant drugs used to combat phobia.

Now in midstream, the study was initiated by Drs. Gary Jacobson and James C. Ballenger, a former MGH psychiatric resident, now at the Bethesda Naval Hospital in Bethesda, Md. Dr. Jacobson is an MGH Associate Psychiatrist and Cochief (Clinical Psychiatry) of the Freedom Trail Mental Health Center of the MGH-affiliated Erich Lindemann Mental Health Center. Dr. David V. Sheehan, Chief Resident on the MGH Psychiatric Consultation Service, is the project coordinator and is administering the medication and conducting supportive group therapy.

Another MGH psychiatrist, Dr. Robert W. Ferrell, Jr., is following patients and continuing their treatment

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EDITORIAL:

On Biting the Hand That Finds Cures

Medical research is one of the most vulnerable of human endeavors. Everyone wants investigators to find new cures and improved treatments. Some people, however, seem to oppose virtually every human-research study aimed at finding these cures. Enmeshed in the righteousness of consumerism – itself a worthwhile cause – some of the more extreme individuals have carried a good idea to its illogical conclusion. In the name of individual rights, these twentieth-century Quixotes joust with the sole means of achieving improved medical treatment for mankind.

Therein lies the nub of the problem. To improve therapy new methods must be used. Devising and testing a new method – by definition – constitute research. Well, why cannot the research be performed on animals? It usually can. And when it can, responsible investigators do perform their studies on animals – first. If the animal studies prove effective and sufficiently safe, the treatment is ready to test in humans. Only a small portion of those suffering from the disease involved undergo the first trials. In a cautiously prescribed manner the responsible investigators can follow a comparatively small group carefully, ready to intervene if necessary. Only under the carefully controlled conditions employed is it possible to determine whether the treatment represents an advance. Should this prove to be the case, society is the beneficiary, and the patients participating are the first to gain relief.

Obviously the road to successful research is lined with potential booby traps. It is possible that an overly eager scientist can impose an experiment without considering the vitally necessary patient safeguards. That is why Dr. Henry K. Beecher, former MGH Chief of Anesthesia, campaigned so long and loud across the country for suitable protective measures. Partly as a result of his efforts, the MGH established one of the first committees charged with protecting the rights of patients and other volunteers. A page 1 article explains how that committee evolved into one of the most respected.

Fortunately the MGH is far from alone in offering such protection. In fact the Department of Health, Education and Welfare requires a human-studies committee of all institutions receiving grant or contract funds from Washington for human studies. It is reassuring to know that despite headlines about the occasional trespass, most of America's medical research is carried out under a sturdy protective shield.

Phobias Themselves May Stop Phobics From Seeking Help

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on completion of a 12-week experimental period.

Being tested is a drug belonging to the class known as MAO inhibitors, and another from a group called tricyclic antidepressants. Instead of medication, some patients receive a placebo, an inactive tablet. The project is double-blind. (Neither patients nor doctors know which of the two drugs each person is receiving, or whether he is receiving the placebo.)

In addition to testing the relative effectiveness of the medications, the investigators hope to add to the comparatively scanty basic knowledge about phobic states.

Dr. Sheehan, who is also a Harvard Medical School Clinical Fellow in Psychiatry, said:

"We're trying to clarify the answers to some simple questions. Such as: What kinds of people become phobic? Are there any precipitants that make people more vulnerable? Is there any particular age or sex distribution, and in what ways do phobic states resemble or differ from other psychiatric syndromes [groups of symptoms]?"

A phobia, Dr. Jacobson explained, is not a single disorder, but a symptom involving abnormal avoidance. Although it may appear alone, it may also coexist with other problems such as depression. Whether or not the psychiatrist directly attempts to treat the phobic symptom itself depends on its relationship to the patient's other problems.

No one is sure how phobias arise. Various theories link the problem to sad or frightening events, unconscious conflicts, and hormonal changes.

There appear to be two basic types of phobic individuals. One fears something very specific such as heights, some kind of animal, disease, or even household objects. Another, like a large portion of those in the MGH study, has a generalized dread which confines him in many ways.

Vulnerable to sudden attacks of panic, such persons often arrange their lives in rigid, restricted patterns. A man may, for example, journey to and from work but otherwise never venture from his house.

Sometimes the phobia "spreads." A phobic person may begin with a fear of a single situation and then go on to become phobic toward objects or places associated with the original circumstance.

One such woman came to the MGH with an exaggerated fear of harming others. Because she dreaded unrealistically that she might push somebody onto the tracks, she came to fear subway stations as well. A phobic person can form hundreds of these associations.

The problem itself often becomes an obstacle for the individual seeking help. Needles terrified one young woman in the MGH program. Afraid that she would be forced to have an injection or blood test, she had avoided doctors and hospitals for ten years. Even coming to see psychiatrists, when intellectually she knew she would face no needle, demanded effort.

The investigators have discovered that mounting anxiety may cause their patients to consider dropping out of the study. They require constant reassurance.

Dr. Sheehan described how difficult the housebound Boston woman had found visits to the hospital for treatment:

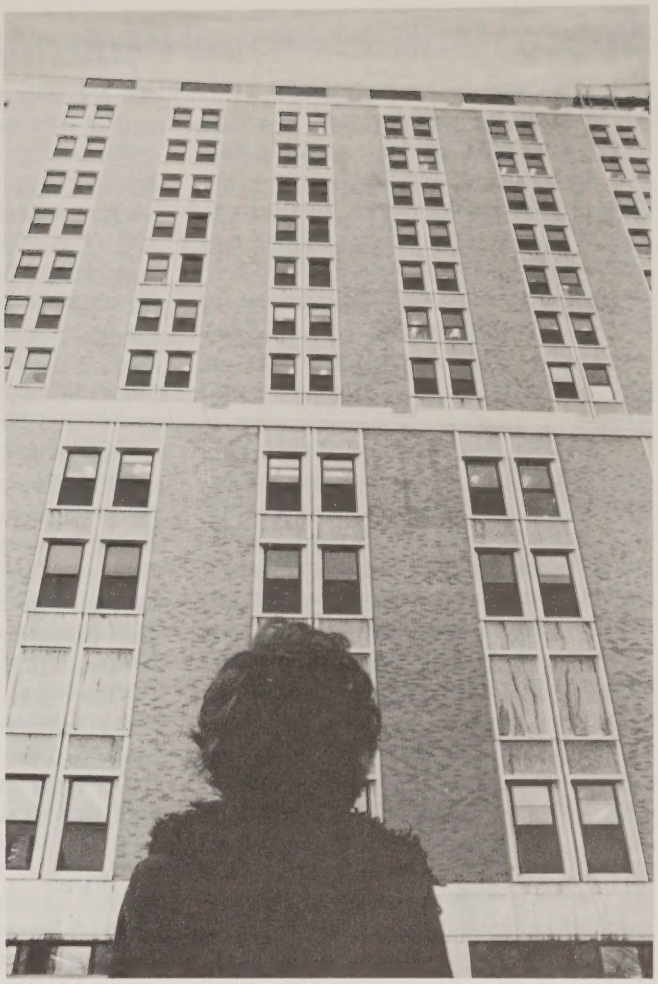
"At her first group meeting, she wouldn't come in and sit down in the room. Throughout the session, she stood at the door, occasionally running, crying and frightened, to her mother, who was outside in the waiting area."

Many phobics realize only too well the irrationality of their fears and want to rid themselves of them. Others simply adjust, avoiding whatever frightens them and making excuses for their behavior. When this happens, the patient's family often asks him to seek treatment.

If untreated, the problem can persist for decades. Transient phobias, however, which vanish without special treatment after two or three months, are not uncommon, especially among children.

The MGH psychiatrists have limited their study to patients aged 21 and over who have suffered from their illnesses for at least six months and who experience severely restricted lives.

The investigators' original interest in conducting the project grew out of a visit to the MGH by a group of psychiatric researchers from England's Oxford University. The British team reported that large numbers of their clinic patients were being treated for phobic anxiety. A New York psychiatrist, Dr. Donald Kline, called attention to a similar experience in a recent study at the Long Island Jewish-Hillside Medical Center.



Some patients fear and avoid heights.

Dr. Kline has also published what is believed to be the only other double-blind investigation of tricyclic antidepressants as antiphobic agents. In that study, however, no attempt was made to compare tricyclics and MAO inhibitors.

Both drugs in the study have shown promise in treating phobias. In England and Australia, psychiatrists favor MAO inhibitors. These medications, however, have one major drawback. They react adversely with some foods, particularly cheese. All patients in the MGH project are instructed to avoid these foods.

Tricyclic antidepressants offer an additional potential advantage over the other medication. They are already popular among American psychiatrists as weapons against depression. Should these medications prove the best agents against phobic anxiety, doctors are likely to accept them more readily.

At present, physicians in this country seldom use antidepressant drugs for phobias, preferring alternative methods. Most commonly used is desensitization: In a gradual way, the physician encourages the patient to encounter the feared object. Also favored is a psychodynamic approach, which allows the psychiatrist to probe the individual's unconscious for the roots of his problem.

Dr. Jacobson, a Harvard Medical School Assistant Professor of Psychiatry, believes that combining one or both of these methods with medication may prove the most effective attack.

During their 12 weeks in the MGH study, patients receive the drugs in specially made identical vials and capsules. They also attend weekly group sessions and are encouraged to face the object of their fears gradually. A great deal of emotional support is offered. An individual afraid of leaving home might first try stepping out the front door and later perhaps venturing down the block. This technique resembles systematic desensitization but lacks its highly structured procedure.

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Subcommittee's Basic Element: Humaneness

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U.S.P.H.S. was empowered to withhold funding from such research if it had not received approval from a human-studies group at local institutions.

For those interested the agency prepared a guide on how to set up such a group. Included were the minutes of an MGH subcommittee meeting. They exemplified careful records which the U.S.P.H.S. required all institutions to keep.

From its inception the MGH Subcommittee on Human Studies has gone beyond the screening of only government-supported research. No matter what his funding source, every MGH investigator asking people to participate must submit his project to the scrutiny of the subcommittee. Most other institutions utilize a similar approach.

But the subcommittee is much more than simply a review board. As medicine and the world around it change, it has to grapple with and attempt to resolve questions about experimentation in man. As a consequence the subcommittee itself is changing to meet the challenge.

At first the subcommittee was comprised largely of practicing physicians and physician-investigators. Included are persons who collectively represent expertise in 18 subjects important to human studies. One member, for instance, is an expert in radioactivity and safety limits on its use. The subcommittee also includes a priest-psychiatrist knowledgeable in the psychological aspects of human research and a physician with extensive knowledge of genetics.

Spurred by the feeling that full protection of study volunteers demanded a broader membership, the group has gradually expanded. Its ranks now include a hospital lawyer, a hospital chaplain, a patient-care representative, a social worker, and the Director of the Department of Nursing, Miss Mary E. Macdonald, RN.

Known as an ardent advocate of the patient, Miss Macdonald believes that the subcommittee's membership, embracing so many disciplines, is one of the best guarantees that the MGH patient is well protected.

"I am tremendously impressed," she said, "by the large spectrum of knowledge which this group brings to the conference table. I am also impressed by the patient-care orientation of the group, the seriousness with which it takes its charge, the thoroughness of its investigations, and its basic emphasis on humaneness and respect for the dignity of the individual."

Members of her nursing staff sometimes approach her with questions about experimental procedures. She finds it reassuring to tell the nurses that the subcommittee has scrutinized these and found them safe.

Just as the physicians and scientists have their areas of expertise, the lay subcommittee members have particular interests. Miss Macdonald focuses on the care that the patient receives, his general well-being, as opposed to the treatment he gets for a specific condition. Chaplain Allan Reed feels that interpersonal relations, such as the doctor-patient relationship, are important.

Recently the subcommittee went outside the MGH to enlarge its membership. In October it welcomed Mrs. Ann Witherby, a Boston resident who represents community interests.

In its monthly meetings the group considers two basic types of research proposals. One is innovations in either treatment or diagnosis in the care of the participating patient. While previous studies in experimental animals, patients, or both, have provided some data on such procedures, they remain unproven.

The other type, forming a large portion of proposals considered, is much more likely to benefit future patients than the person participating in the study. The distinction is important – particularly when evaluating the risk posed by an investigative procedure.

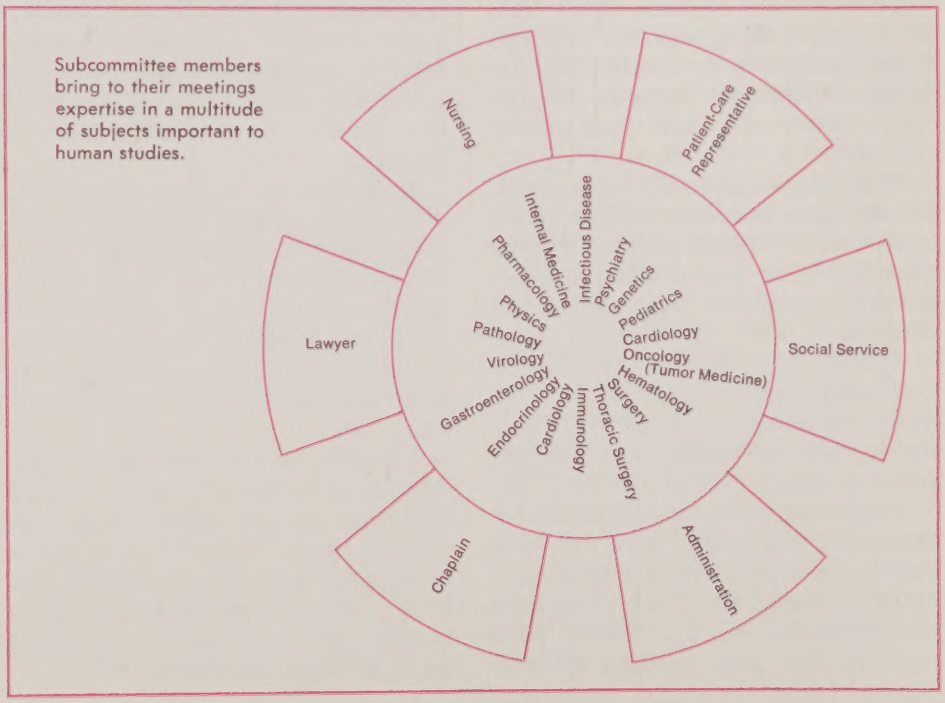
"If there is a slight or moderate risk, but a significant potential benefit to the patient-subject, then benefit can outweigh the risk," said Dr. Morton N. Swartz, the subcommittee's chairman and Chief of the MGH Infectious Disease Unit. "But it's much more difficult to justify *any* significant risk when there is no benefit in view for the subject himself."

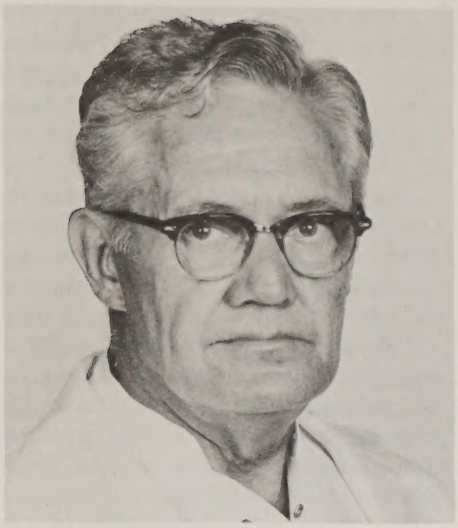
Often the full expertise of the group must be brought to bear to determine potential harm. From their vantage point, subcommittee members are in a position to spot dangers which investigators may overlook.

Beyond purely physical hazards, the group must consider possible social, legal, and psychological harm. Although a patient might escape risk, for example, and even benefit minimally from a procedure, it might greatly upset his family. Such potential could bar the research.

In another instance the group might turn down the study of a town's public records, such as school attendance information, even in the absence of direct contact with individuals. Such a project might rob the townspeople of their right to privacy.

With each proposal, the subcommittee also considers one other major issue: informed consent. The participant





Dr. Henry K. Beecher
He championed a cause.

must fully understand the proposal and freely assent to it.

All investigators must prepare a consent form for the participating subjects to sign. This document spells out in detail the risks and potential benefits.

"Some researchers fear that if they tell the subjects all the drawbacks and problems, they won't agree to participate," said Chaplain Reed. "Were that true, however, no one would ever agree to take part in any projects of a physician we know who writes everything out in clear and excessive detail. But most people do. He develops such a good relationship with them that they agree on the basis of trust in him."

Informed consent is not always clear-cut. Investigators must tread carefully when approaching candidates for their studies, especially with patients suffering from severe illness.

"The patient is always very eager for the possibility that something will either prove a better diagnosis or treatment for his condition," said Ralph G. Meader, Ph.D., MGH Deputy Director (Research Administration). "He may believe *he* will benefit from a procedure, even though he may be told by the doctor that it is only intended to benefit *others.*"

The subcommittee strives to protect patients from such situations.

Anxiety can weaken the patient's ability to make a free choice.

"We are concerned that patients don't feel intimidated by being asked to participate," said Miss Isabella Tighe, the MGH Patient-Care Representative. "They must understand that if they say no, it will not prejudice their medical care."

Through the efforts of the subcommittee, she said, investigators are becoming more and more sensitive to the problem.

For some, fully informed participation may be impossible. Children fall into this category. In addition to the required approval of child and parents, each child participating in a study is assigned a physician advocate to guard the youngster's rights and welfare.

Occasionally the subcommittee questions whether certain volunteers, such as prisoners, can give truly free consent. Because of their unusual situation, they may feel pressure to participate. If an investigator asks workers in his laboratory to serve as subjects, he may also exert some subtle coercion.

The Subcommittee on Human Studies may approve a research protocol exactly as the investigator draws it up. Often the subcommittee asks the researcher to come and explain or defend what he intends to do.

Because the subcommittee has been reviewing proposals for a number of years, MGH investigators have become familiar with human-studies requirements. Consequently, the group frequently approves a researcher's plan after only minor changes. These commonly involve the consent form. Few proposals submitted are so unacceptable that modifications cannot solve the problem.

Seldom does the subcommittee end its discussions without full agreement.

"We practically never take a vote," said Dr. Edgar B. Taft, the group's Executive Secretary and an MGH pathologist. "I can only remember once in the eight years that I've been associated with this committee that there was ever a vote with a certain number of people for and a certain number against. Everybody is either for approving the proposal, seeking changes, or asking for more information."

In the future, subcommittee members expect their task to grow more complex and difficult. But they are also optimistic that they have the collective strength to continue to do the job.

Some members expressed the fear that they may stifle valuable research by becoming overzealous in their protection of the volunteer subject. The answer, Dr. Swartz said, lies in a delicate balance which compromises neither research nor participant.

He Saw the Patient As Part of a Social System

Twenty-six years ago, when the treatment of mental illness was largely confined to institutions, Dr. Erich Lindemann was setting up in Wellesley the first community mental health center in the country.

A patient must be viewed in the context of his social situation, he believed. His theory was that people function in social clusters and that crises occur when the structure is thrown out of kilter.

Dr. Lindemann was Chief of the Department of Psychiatry at the MGH from 1954 until his retirement in 1965, when he accepted a professorship at Stanford University. By the time of his death on November 16, 1974, his ideas had helped shape public policy in mental health, and he had helped launch a new field – social psychiatry.

"He forged a unity between medicine and social science," said Dr. John M. vonFelsinger, Chairman of the Department of Psychology at Boston College and formerly Chief Psychologist at the MGH.

"The mark of his genius was his capacity to reduce the language and concepts of diverse fields to a common denominator."

His interdisciplinary approach had its roots in Germany, where Dr. Lindemann was born in 1900. To a classical education he added a degree in both psychology and psychiatry from the Universities of Marburg and Giessen. In 1927 he left Germany to become a research associate in psychology at the University of Iowa.

One of his early interests was the effect of drugs, such as mescaline and sodium amytal, on mental functions. His work with barbiturates led to the discovery of their value in releasing a patient's suppressed emotions and memories.

Dr. Lindemann joined the MGH in 1936 and headed the Psychiatric Outpatient Department two years later.

After the disastrous fire at the Coconut Grove nightclub in 1942, he published what is now considered a classic paper on the effects of bereavement and the management of grief. From this study grew his interest in how changes in a person's social environment can create a crisis.

The effects of sudden loss became the key to another area of Dr. Lindemann's investigation: ulcerative colitis

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His Sensitivity Inspired the Trust of Patients

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(inflammation of the colon). He found that the condition began when a person important to the patient was in some way lost.

"He would learn the characteristics of the essential person and begin role-playing with the patient," recalled Dr. John C. Nemiah, Psychiatrist-in-Chief at Beth Israel Hospital and formerly head of the MGH Inpatient Psychiatric Service. "He got some very dramatic responses, with symptoms disappearing in 24 hours."

In 1948, Dr. Lindemann's interest in community psychiatry found full expression in the Wellesley Human Relations Service. While the facility offered every variety of psychiatric service to its clients, it also provided a base for studying social conditions that gave rise to mental illness.

Preventive psychiatry became the dominant theme of the center. The staff sought the "caretakers" in the community – priests, ministers, teachers, and policemen – and worked with them to develop their natural capacities for dealing with problems.

The service became the prototype for numerous centers that have sprung up throughout the country, including, in 1971, one with strong MGH ties, the Erich Lindemann Mental Health Center in the Government Center.

After Dr. Lindemann's appointment as Chief of the Department of Psychiatry in 1954, the department became increasingly involved in the community, adding at the MGH an acute psychiatric service and alcohol clinic and expanding the departments of psychology and social work to include community mental health programs.

He also became the Professor of Psychiatry of Harvard Medical School at the MGH. His influence had already been felt in Harvard's Department of Social Relations and School of Public Health, where he held posts.

In 1957 a group of Bostonians experienced a community crisis – the forced relocation of 2,600 families in the name of urban renewal. The stress they experienced became the subject of a study headed by Dr. Lindemann and known as the West End Research Project.

More significant than financial loss, the team of investigators learned, was the tearing away of families from a close group of people on whom they depended.

This fabric of human relationships was described in *The Urban Villagers,* a book by Herbert Gans, a University of Pennsylvania sociologist who worked as a participant-observer on the project. The book is now required reading for anyone whose decisions affect city-dwellers.

Although many of Dr. Lindemann's activities were in social fields, he was a brilliant psychoanalyst and for three years a president of the Boston Psychoanalytic Society.

"His case conferences were startlingly beautiful," Dr. vonFelsinger said. "He had a tremendous capacity to cleave things to the essence, both in integrating concepts of various fields and in understanding a patient's life."

This combination of penetrating thought and lucid expression had a powerful effect on listeners. There were personal qualities, too, that inspired the trust of patients.

"He was a very emotional and feeling person, with a high sensitivity for the predicament of people," said Dr. Clemens E. Benda, a close personal friend and psychiatrist on the MGH Board of Consultation.

His colleagues found him warm, gentle, and generous. He gave to his staff much freedom and encouragement to pursue their special interests.

Dr. Lindemann's influence was felt at the national level through his frequent service on committees on stress and preventive and social psychiatry. He also served as a special consultant for the World Health Organization.

National and state efforts to return the patient to his community for care are now making headlines. To Erich Lindemann, the patient always had to be viewed in the context of his environment, just as psychiatry had to reach beyond the wards.

Dr. Erich Lindemann at Psychiatric Grand Rounds. His brilliant diagnoses held listeners spellbound.

COMBATTING PHOBIAS

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At the beginning, middle, and end of the 12 weeks, the investigators ask each patient to fill out a variety of forms which helps to measure his progress.

When he has completed the experimental period, any patient who wishes may join Dr. Ferrell for more intensive group therapy.

"In this group we encourage their evolving interpersonal relationships," said the Harvard Medical School Instructor in Psychiatry, "and through a process of recognizing similarities and differences between problems, they gain support for discussing the nature of their fears. We also continue the desensitization technique when appropriate for a given individual."

His patients receive whichever medication appears the most effective at a particular stage of the study.

About 10 persons have passed into Dr. Ferrell's care so far. Another 40 must do so before the study is complete and the results are determined.

Test's Precise Aim Helps Heart Patients

Major hospitals across the country have eagerly adopted an MGH solution to a problem which has long plagued doctors treating heart disease.

Encouraged by this success, investigators at the MGH and elsewhere have begun applying the solution's basic techniques to similar difficulties in other disease areas.

The original problem involved digoxin, a powerful, fast- and long-acting heart stimulant that represents one of the best weapons available against heart disease. In miniscule doses, this drug can speedily correct an irregular heartbeat (cardiac arrhythmia) or increase the pumping strength of the cardiac muscle weakened by heart failure. Too much digoxin, however, can prove harmful. A fraction in excess of the already tiny daily dosage can cause a toxic reaction.

Since each person reacts differently to a drug, the proper digoxin dosage varies from one patient to the next. This variability makes individual need difficult to predict.

Despite the exacting precautions taken by physicians, toxic reactions were common. Though these may manifest themselves as nausea or loss of appetite, they occasionally also cause life-threatening arrhythmias. Since other conditions can mimic toxicity, detection can prove troublesome.

In 1969, Dr. Thomas W. Smith, working with Dr. Edgar Haber, Chief of the MGH Cardiac Unit, devised the first method of determining blood concentrations of digoxin. This information has proven useful in identifying and preventing digoxin toxicity. Grants from the National Institutes of Health and the American Heart Association helped support the effort.

Harnessing the precise targeting powers of the body's immune system, the cardiologists developed a test capable of measuring the tiny quantities of the drug in the patient's blood. Blood level indicates how much of the substance is present in the patient's body, providing a clue to the presence of toxicity. The procedure is known as a radioimmunoassay.

It was one of the first such tests for a drug. Dr. Charles Oliver at Washington University in St. Louis had developed a radioimmunoassay for digitoxin. Related to the more commonly used digoxin, this substance carries the same danger of toxicity.

Drs. Smith and Haber, however, developed a more practical procedure. Their test is simpler, requiring from laboratory personnel less time and expertise. Later an equally simple assay for digitoxin was devised in the MGH Cardiac Biochemistry Laboratory.

Since 1969 the digoxin procedure has sharply reduced the number of patients experiencing toxicity.

The impact of the test is due in good part to the widespread use of the medication. A derivative of digitalis, a substance known to man for centuries, digoxin belongs to a large family of drugs known as cardiac glycosides.

The digitalis drug most commonly used in the U.S., digoxin usually comes in tablet form. Its normal daily dosage is roughly one half a milligram (1/60,000 of an ounce). Digitalis itself originates in the leaves of the foxglove, a plant common in New England.

In addition to lowering the incidence of toxicity, the radioimmunoassay has had a number of additional benefits.

In a research project, it helped confirm that patients suffering acute myocardial infarctions (heart attacks) are more than normally sensitive to digoxin. Doctors also applied the test to patients who for no apparent reason benefited very little from the drug.

"It turned out," Dr. Smith said, "that these patients were taking tablets which had poor bioavailability. That is, even though the proper amount of digoxin was in the tablet, it was not getting into the patient's system. It therefore had almost no effect."

There exists another group of patients who fail to absorb digoxin from any tablet. Extending to other drugs and even to nutrients from food, this difficulty is called malabsorption. The assay has helped physicians to develop effective treatment for heart patients having this condition.

The radioimmunoassay has also proved helpful in several other applications.

Because of its simplicity and wide use, the digoxin test has helped spark interest in the basic technique itself. Researchers have now devised assays for a number of drugs outside the digitalis family, including morphine and some of the tranquilizers and barbiturates.

These tests are of research interest, although the dosage of such drugs is usually large enough for conventional chemical assays to detect. Dr. Smith estimates that a digitalis derivative is the target in 9 of every 10 drug radioimmunoassays.

Plans are afoot to develop such procedures for other low-dosage medications.

Long before its drug applications, the radioimmunoassay technique

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Technician Marcia L. Jackson measures out small samples of patient blood plasma, readying them for testing.

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Test Relies on Tiny, Choosy Particles

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showed itself useful in research on hormones and other substances which the body itself manufactures. Like digoxin, these often appear in the bloodstream in minute amounts. Pioneering work in this area involving MGH investigators served as a foundation for the development of the digoxin assay.

"At the time the assay for digoxin was born, we were deeply involved in trying to understand the renin [kidney protein]-angiotensin [hormone] system in causing high blood pressure," said Dr. Haber, a Harvard Medical School Professor of Medicine. "We had developed two different radioimmunoassays which are presently being applied. One of them, the renin activity assay, has become a routinely used patient assay here and at many laboratories across the country."

The digoxin assay itself relies on the same advanced techniques as its hormone-test predecessors. For the opportunity to apply such techniques to its development, Dr. Haber credits a group of basic science researchers in his laboratory.

A later step in the procedure: Plasma containing radioactive antibody linked to digoxin is decanted into a special fluid used in the radiation counter.

To perform the procedure, the physician first removes a small amount of blood from the patient. To plasma from this sample the technician adds a sample of radioactive digoxin and an antibody which specifically binds to the drug. Antibodies are particles which the body forms to combat the invasion of a foreign substance, such as bacteria.

The antibody prepared for the assay is produced in an animal and is highly specific to the drug. The particles will seek it out from among materials of similar chemical structure and bind to it.

The radioactive digoxin competes with any ordinary digoxin already in the patient's plasma for the binding sites of the antibody. The more of the heart stimulant in the patient's blood to begin with, the less radioactive material will link with the antibody.

After antibody-bound and free digoxin are separated, a radiation counter then measures the radioactivity of the antibody-digoxin combination which remains. The greater it is, the less digoxin was originally in the circulation.

Since many persons escape digoxin's complications, Drs. Smith and Haber do not recommend that all patients be tested.

Relying on such factors as muscle mass, kidney function, and ability to absorb the drug, physicians can usually accurately predict the proper dosage. Any patients failing to benefit fully from the substance or showing even mild suspected toxic reactions, however, can be helped by the use of the assay.

Dr. Haber pointed out that level of digoxin in the blood alone does not determine toxicity. Patients with mild heart disease, for instance, can tolerate higher levels of digoxin before experiencing adverse effects than can sicker patients. Other variables can also alter the effect of the drug.

The radioimmunoassay's developers feel that the procedure will continue to affect patient care in a fundamental way.

"It's apparent that drug toxicity is one of the most pressing problems in medicine today," said Dr. Smith, now Chief of the Cardiovascular Division at the Peter Bent Brigham Hospital and Associate Professor of Medicine at Harvard Medical School. "Any tool you can give the physician to permit him to use a drug more effectively and to lower the incidence of toxicity is bound to have great impact clinically.

"And if drugs are being given which are effective in very, very minute concentrations, the radioimmunoassay will continue to be one of the useful ways of measuring them."

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MGH News

Vol. 34 No. 2 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS March, 1975

Dramatic Progress Exemplifies Total Patient Care

Form of Arthritis May Be 300 Years Young

What can you learn about the chronic and painful disease known as rheumatoid arthritis from ancient skeletons, early medical writings, Shakespeare, the Bible, and the paintings of Botticelli?

That not too long ago, rheumatoid arthritis apparently did not exist, according to a study by an MGH physician.

Reaching across the centuries to review the evidence, Dr. Charles L. Short concluded that the disease was first convincingly described in the Latin writings of a 17th-century Englishman, Dr. Thomas Sydenham.

But why bother to determine the antiquity of the disease?

Dr. Short explained that knowledge of when the condition first arose could help uncover its cause which has stubbornly eluded researchers. A relatively recent origin, for example, might be linked with a change in environment or manner of living.

Dr. Short is not the first to suggest that rheumatoid arthritis is a relatively "new" condition. In 1952, a Danish investigator, Dr. E. Snorrason, challenged the long-held assumption that its origin was ancient. In the years since, others have joined him in support.

Investigators generally agree that rheumatoid arthritis must have existed by 1800. On August 3 of that year, Augustin-Jacob Landré-Beauvais, a French medical student, presented a doctoral thesis entitled: "Should We Recognize a New Type of Gout, to be Called Primary Asthenic Gout?"

Landré-Beauvais described in detail for the first time six patients with what physicians would recognize today as signs typical of rheumatoid arthritis. The first was 35-year-old Marguerite Garnier, who had been often exposed to cold and damp. From age 20, she suffered attacks of pain, redness, and swelling in her knee, foot, and wrist joints. These attacks left her with permanent deformities and "no hope of cure."

The Frenchman was undoubtedly describing the symptoms and signs of rheumatoid arthritis, which even today physicians can alleviate but not cure. He was thus the first to set the disease off as a separate entity.

(Continued on Page 7)

Steven

As 2½-year-old Steven toddled determinedly into the center of the MGH amphitheater, several dozen smiling faces followed him.

But Steven took no notice. He was intent on the lollipop in the hands of Dr. Michael G. Ehrlich, the pediatric orthopedic surgeon who stood at the podium.

"What's my name, Steven? Do you know?" asked the surgeon.

"Dr. Ehrlich," came the confident answer.

Those few faltering steps and alert reply were symbols of triumph – triumph over a congenital spinal defect which 2½ years before had led doctors to advise the youngster's mother that nothing could be done. Born with paralysis of the legs, Steven seemed at best to face mental retardation and a short life confined to a wheelchair.

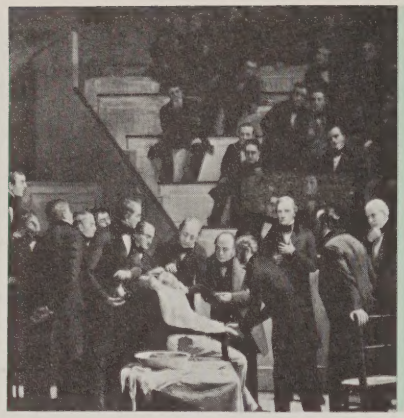
The forum for this dramatic demonstration of Steven's progress was an MGH Pediatric Grand Rounds, which since September has been operating in an innovative format.

Grand rounds are periodic conferences designed primarily to teach medical staff and residents. To examine a difficult health-care problem, the physicians rely on the example of a single patient's medical history.

Known as "Total Patient-Care Grand Rounds," the new format's basic premise springs largely from the philosophy of the Chief of the MGH Children's Service, Dr. Nathan B. Talbot.

Dr. Talbot believes that when young patients are treated, medical and social problems are inseparable. He pointed out that many childhood medical dif-

(Continued on Page 2)



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EDITORIAL:

Pointing Toward the Ideal

In an age of specialization the tendency to become immersed in one's subject to the exclusion of even closely related areas of life is overwhelming. We all tend to observe better what education or interest prepared us for and experiences reinforced. A carpenter who builds only bookcases looks at a tree and sees shelves. An assembly-line worker who tightens one bolt would be helpless if asked to build a car. There are horticulturists who can describe the precise characteristics of the one species of rose they grow but are unable to explain how to save a sick philodendron. And there are lawyers who are expert in divorce but who fail to even recognize when a marriage can be saved.

Medicine is no exception. Unless he scrupulously resists the tendency, the specialist may see the organ he treats but not the patient. Not until 1905 when the MGH formed the world's first hospital social service department did a medical institution elevate the patient's social well-being to the level of a major concern. Even the tempering effect of modern social service has only partly counteracted the narrowing influence of specialization. In the ideal situation the internist or pediatrician orchestrates a team of specialists.

A new teaching experience inaugurated at the MGH is an admission that the ideal has not yet been reached in American medicine. Nor is that lack of fruition surprising either. Specialization is not the only reason. Today we are beginning to realize that much of what is called patient well-being involves areas over which medicine has at best modest influence: traffic accidents, smoking, promiscuity, excessive drinking, malnutrition, neglect, abuse, etc. The MGH Total Patient-Care Grand Rounds described in a page 1 article addresses the problem of integrated care frontally. Specialist and generalist, physician and nonphysician observe how a team of their colleagues wrestled with the many medical and social needs of a given patient. Persons from other hospitals also come to learn. The new rounds do not guarantee integrated medical care. But what the audience sees and hears should make an important contribution.

Affection and Caring: As Vital to Growth As Nutritious Meals

(Continued from Page 1)

ficulties arise from social ones such as inadequate prenatal care, malnutrition, abuse, and neglect. Conversely, a disease like Steven's may threaten to cause social stumbling blocks.

"Each child," Dr. Talbot said, "requires social as well as biological nourishment. Affection, caring, and supervision are as vital to a child's growth and development as the nutrition that food provides."

The new grand rounds are aimed at instilling the health-care team with an appreciation of the child's many, interlocking needs.

Not Simply Compassion

"These rounds are designed," Dr. Talbot said, "to view the patient in a biosocially comprehensive way.

"Our outlook is not based simply on compassion. The approach also rests on thorough knowledge of the child's requirements."

Following these precepts the pediatric Total Patient-Care Grand Rounds have ranged over topics as varied as kidney disease and burns.

In many ways the conference at which Steven appeared was typical.

Steven was born with a condition known as myelodysplasia (defective development of the spinal cord) with myelomeningocele. Roughly at the midpoint of his back, his spinal column was open, and a protruding sac contained parts of his deformed spinal cord and spinal nerves. The spinal cord problem can affect strength and feeling in the legs, as well as bladder and bowel function. This disease affects about one in every 2,500 children born in this country.

Dr. M. Edward Keenan, an MGH pediatrician, began the conference by describing how Steven came to the hospital and by providing some general information about the condition. Like the other physicians treating the youngster, Dr. Keenan is a member of the recently formed MGH Myelodysplasia Clinic.

Steven's local pediatrician and a neurologist at the western Massachusetts hospital where he was born agreed that he should go home without surgery to repair his spinal defect.

When the boy was three weeks old, his mother rejected this advice. She drove Steven to Boston and walked unannounced into the MGH.

On examining him the MGH physicians found that he had club feet and two dislocated hips. He was suffering from hydrocephalus, a head swollen with excess spinal fluid. These symptoms commonly accompany myelodysplasia.

Help Curb Infection

Steven also displayed a lückenschädel deformity (a thinning of the skull), considered a bad sign in children with his disease. In addition, the opening in his spine had become infected.

During the 60 days of Steven's first stay at the hospital, MGH nurses constantly cleaned the defect to help curb the infection.

When Steven reached six weeks of age, Dr. Paul H. Chapman, the MGH children's neurosurgeon, operated to close the opening. Two weeks later he performed another operation called a ventriculoperitoneal shunt. At the grand rounds Dr. Chapman explained that this involves implanting a tube to drain spinal fluid from the brain into the abdomen. Without a shunt hydrocephalus can prove fatal or result in severe mental retardation.

Steven then spent a brief period at home.

At four months of age evaluation for a fever revealed a urinary tract infection. Kidney and bladder evaluation showed a probable neurogenic (disordered because of a nervous-system abnormality) bladder. Dr. Samuel H. Kim, an MGH pediatric surgeon, described to the grand rounds audience the urinary problems associated with myelodysplasia and the present-day management.

Dr. Nathan B. Talbot, Chief of the MGH Children's Service, introduces a Total Patient-Care Grand Rounds.

Over the following two years, the youngster underwent five operations, all designed to correct various orthopedic problems. He alternated stays at home with hospital visits.

Wanting to enable Steven to walk, Dr. Ehrlich began by repairing his club feet. Then, because he was lacking the muscles which normally stabilize the hip and keep it in the socket, walking seemed out of the young patient's reach. But by transplanting two unparalyzed muscles which were actually causing the hips to dislocate, Dr. Ehrlich explained, he was able to put these muscles to work to enable Steven to walk.

With his knees braced, the boy can now do so.

Meanwhile, Steven fortunately outgrew the need for his shunt, and Dr. Chapman removed it.

As the MGH physicians were quick to point out, Steven is no ordinary myelodysplasia patient. He avoided many of the complications which usually affect children with the disease. Among the conditions he seems to have escaped is mental retardation, which without prompt and proper care occurs in at least 75 percent of these children.

Social Side Effects

Steven may also elude most of the adverse social side effects of his illness.

Joining the physicians at the grand rounds was Miss Evelyn Corsini, an MGH social worker assigned to the Myelodysplasia Clinic.

Parents, she said, are at first greatly shocked when their newborn child turns out to have a condition they probably had never heard of until that moment. They face years of medical appointments, high expenses, and worry. Yet healthy parental attitudes are vital to the young patient.

"Every stage of the child's normal development," Miss Corsini said, "may be complicated by his medical problems, especially when he comes to an age when most children are independent of their parents in many ways.

"The child's ability to master his handicap, to walk, or to learn how to manage his bowel and bladder function depends to a great extent on his emotional well-being. The child who is overprotected, rejected, or the source of constant arguments between his parents has a psychological handicap added to his physical one.

"It's vital for a clinic offering total service to a child with myelodysplasia to help his parents with their fears and worries, and whatever frustrations they may have."

Dr. Keenan pointed out that Steven's very dedicated mother had aided immeasurably in his care.

The grand rounds on myelodysplasia, like the others in the total patient-care series, proved tremendously popular. Attendance has been running at three to five times the levels before the new concept took effect. Physicians from other area hospitals, and even some from adjacent New England states, have been attending the conferences.

Occasional Complaints

Dr. Talbot has even heard occasional complaints that the rounds are too crowded. And nothing could please him more. He believes it vital that the total patient-care approach reach as many people as possible. He would like to see pediatricians everywhere intervening to solve medical-social problems.

The MGH Children's Service Chief recalled one such intervention which first started him thinking along total patient-care lines.

In 1947, a 7-year-old girl living with her foster mother was admitted to the MGH with the height of a 4-year-old and the weight of a 2-year-old. After a battery of tests aimed at uncovering a glandular disorder, MGH physicians decided that she simply was not getting enough nourishment. They prescribed a highly nutritious diet and sent her home.

Six weeks later, she was back. Nothing had changed. Probing deeper into the matter, the physicians discovered that a court had taken the little girl from abusive and neglectful parents. From her foster mother the child was receiving the first true affection and caring of her life.

Yet the uncertain nature of her foster home filled her with anxiety. She feared that she might have to change homes at any time. The court had repeatedly denied the foster mother's requests to be allowed to adopt the youngster.

"And so our treatment for this child," Dr. Talbot said, "was to go to court and recommend that she be adopted."

With adoption, the girl's health soon returned to normal.

Returning to the Mainstream of Life

Drivers along Storrow Drive may have been startled last summer to see a parade of wheelchairs rolling across the footbridge toward the Charles River.

In the morning, twice a week, the group was heading toward the MDC swimming pool. In the evening they joined the audience at the open-air Esplanade concerts.

These were patients who had been hospitalized for weeks, often months, in the MGH's rehabilitation unit on the ninth floor of the White Building. For many, these outings were the first ventures they had made beyond the hospital walls following a serious illness or injury.

Giving them the confidence to do so is an energetic young woman, Miss Paula Beth (Muffy) Lutzin, one of the hospital's seven recreation workers and therapists. They are part of a team of specialists – nurses, physicians, social workers, occupational and physical therapists – who play a role in returning the patient to a productive life.

The "recreation" in front of therapy brings thoughts of pleasant activities for the patient's diversion and amusement. Indeed, one may find everything from rug-hooking to ice-cream making, from gardening to shooting pool, from concerts to old-time movies, from bingo to poker, organized for the patient.

These activities are more than a way of passing time. They bring relief from loneliness and tedium, diversion from pain. And for the patient who has had a disabling illness or injury, recreation therapy can be a way of reentering the mainstream of life.

"A patient's self-image may be badly shaken after a serious illness," Miss Lutzin said. "He may try to isolate himself."

To put him back in touch with the outside world, the recreation therapist assesses the patient's needs, capabilities, and previous mode of living.

The activity may be something as simple as reading a morning newspaper or learning a craft that can be done with one hand. Or it may be a special group project that requires careful planning.

Every week Miss Lutzin and a band of volunteers host a barbecue outdoors or in the hospital's penthouse to give patients on White 9 a social experience away from their rooms. According to the season, they take interested patients swimming or to concerts and sports events.

In these outings, with family and friends joining in, the patient may rebuild his social self. He also gains confidence in using his wheelchair in many environments.

As Miss Lutzin prepared a group of wheelchair patients for Christmas shopping one year, a woman exclaimed, "We're really coming along just to please you, Muffy. No store will let us in."

"They are amazed to find out how much they can do once they try it," Miss Lutzin said. She believes just about anything can be achieved. And her optimism is buttressed by solid evidence.

Several years ago she took measuring tape in hand and examined the accesses to 350 stores, restaurants, churches, sports arenas, libraries, nightclubs, shopping centers, and historical sites in Boston.

The result is *Wheeling Through Boston,* a paperback published by the Easter Seal Society. In it Miss Lutzin describes what places can be visited in a wheelchair and how to reach them.

Her spirit is contagious. One former patient wheeled through his hometown, Wellesley, and sent her the results of his investigation. Such exchange of information allows Miss Lutzin to steer patients toward community resources as they leave the hospital.

For many, the individual relationship with the recreation therapist may be as valuable as social activities or handicrafts.

"*Listening* so often provides the best therapy," said Miss Denise Pomodoro, who brings a gentle touch to her work with older patients on the medical wards. "They need someone who has the time to talk and relax with them."

Companionship is also a primary need of patients in the Baker Memorial, where Mrs. Anne Rosignolo works. Often they have traveled great distances for special treatments, leaving supportive relationships at home.

"You can tell as soon as you walk

John Nobles, left, shares with Mrs. Yolanda Llorca, recreation therapist, his pride in crafting a leather handbag. He learned leatherworking while being confined to bed with a fractured knee.

Patients gather at the bedside of Miss Jane Monahan for camaraderie while working on crafts. John Burke (left) does decoupage with Jasper Lawton, a patient, looking on, while Miss Monahan hooks a rug with advice from Miss Paula Beth (Muffy) Lutzin, recreation therapist.

Bobby Guerriero, 8, starts work on a piece of clay with the guidance of Miss Sally Cave, a "play lady" of the pediatric unit.

into a room how much you're needed there – just by a glance at the patient's face," she said. She finds that interaction – the matching of two avid chess players, for example – gives a great lift to the spirits.

But how can Mrs. Rosignolo respond effectively to the nearly 500 patients who fill Baker's beds? Her task and that of other recreation workers would be impossible if it were not for the support of a corps of volunteers who visit regularly.

Some, like James Gorman, are former patients. Hospitalized on White 9 for many weeks, he became a volunteer immediately after his discharge in 1972. Now he is also a student at Northeastern University. His major? Recreation therapy.

Not every patient finds a career through therapeutic recreation, but many find new sources of pride and interest that last a lifetime.

Mrs. Yolanda Llorca, a recreation therapist who spends much time with orthopedic patients, is an expert craftswoman. With an enthusiasm conveyed in both Spanish and English, she can get patients hooked on crafts they had never heard of.

Matching her dedication is a special group of volunteers – the Ladies Visiting Committee, who last year provided instruction and 2,000 kits of needlepoint to interested patients.

The recreation therapist's relationship with the patient is aided by the fact that the activities are outside the prescribed medical regimen for rehabilitation.

"It's one of the few things to which the patient can say 'no,' " said Miss Sally Cave, supervisor of the "play ladies" on the hospital's pediatric unit. Because the recreation therapists wear street clothes rather than uniforms, the patient may feel freer to let off steam about the frustrations of his illness or hospitalization.

One group of adult patients channeled these feelings into a skit satirizing grand rounds (medical teaching conferences). The laughter proved beneficial to those both in and out of uniform.

For youngsters, play-acting is a natural safety valve for aggressive feelings.

"Children have trouble handling the restricted environment of a hospital," Miss Cave said. "Boredom and fear are also major problems."

In the playrooms at the end of the floors they are free to verbalize their feelings or work them out while pounding clay or smearing paint. Because play is so important in a child's development, there are three professionals on the recreation staff. In addition to Miss Cave, they are Miss Barbara Holland and Miss Pam Yosim.

Miss Cave has found that some of her best ideas come from the children themselves and from their parents. One group of youngsters put on a show with puppets they had made. Teenagers have started newspapers and collections of prose and poetry.

This summer the pediatric recreation staff initiated weekly workshops for parents of children whose activities must be limited for long periods. They exchange experiences and useful information, such as how to recycle common items into creative projects.

The recreation therapist knows she is doing her job when patients initiate their own group activities. One woman surpassed everyone's expectations.

Mrs. Pauline Sabet was a 73-year-old widow suffering from several serious ailments when she was brought to the MGH. After a gangrenous infection necessitated amputation of her leg below the knee, she was depressed and unresponsive for weeks.

But her social worker, Mrs. Pearl B. Aronson, encouraged the staff to keep trying. Finally a volunteer discovered that she had an interest in television's Perry Mason. She arranged to get a pair of glasses for her so that she could watch the show.

A startling physical and emotional recovery began. Mrs. Sabet revealed a talent for leadership, becoming chief organizer of parties and trips. Eleven months after her admission to the MGH she planned a unique event in which everyone could participate – her own wedding to an old friend.

A hospital chaplain performed the ceremony in the MGH Chapel with White 9's head nurse at the organ. The physician who headed the rehabilitation service gave the bride away. The maid of honor was Miss Lutzin; a nursing aide was the best man. A patient played the guitar and made block-lettered invitations for 100 guests.

And Mrs. Sabet *walked* down the aisle.

When the efforts of a rehabilitation team are fused with a patient's own courage, many things are possible.

On warm summer mornings patients are escorted from the hospital's rehabilitation unit for a swim at the MDC pool.

The Body's Early Warning Line for Disease

In the fall of 1973, a 57-year-old woman entered the MGH with painful blisters on her hands and increased hair growth on her face.

Her condition puzzled MGH physicians. The routine battery of laboratory tests failed to pinpoint the problem.

The woman's doctor called in an MGH dermatologist. Within seconds, he offered a tentative diagnosis: She was suffering from a rare disease called porphyria cutanea tarda, which arises in the liver and causes the skin to become extremely sensitive to heat, light, and friction.

The examination of her urine under ultraviolet light verified the diagnosis. During the following year, MGH physicians treated her by drawing a unit of blood every six weeks. The signs and symptoms of her porphyria vanished.

For dermatologists, such medical sleuthing, relying on skin as an indicator of internal disease, is nothing out of the ordinary.

By looking at skin and taking biopsies (small samples of tissue for examination), the dermatologist can quite frequently solve puzzling diagnostic problems for the general physician and surgeon.

An estimated 10 percent of patients the dermatologist sees exhibit some skin signs of internal illness. Because of the large number of more difficult cases referred to the MGH, the hospital's dermatologists find such signs in about 25 percent of their patients.

Skin does not stand alone as a disease signpost. A general illness can manifest itself in anything from swollen joints to psychiatric problems. But the role of skin in pointing out its presence is vital. Since it can so easily be felt, seen, and touched, and a biopsy so easily performed, the body's covering often sounds the first alarm.

"It may offer, for example, the patient's only chance to receive curative therapy for a malignancy, early treatment for liver disease, or an endocrine [type of gland] disorder, before serious complications ensue," said Dr. Harley A. Haynes, Chief of the MGH Dermatology Clinic.

The list of skin signs which can warn of internal disease, Dr. Haynes said, is endless. Among them are pigmentation, hairlessness, excess hair, moisture, dryness, itching, scaling, and many others. The appearance of one of these, however, hardly guarantees that general disease is present. Some symptoms may occur spontaneously. Others may appear with purely skin conditions.

Distinguishing the harmless rash from a serious illness requires an expert eye. As part of his training, the dermatologist learns to tell skin signs apart by selecting the subtle characteristics which mark each one. While two skin lesions may appear the same to the untrained, a glance can often tell the dermatologist that they are very different.

"Patients are sometimes displeased by the fact that the dermatologist is called in, looks, and in seconds or minutes, knows what the problem is," said Dr. Haynes, Assistant Professor of Dermatology at Harvard Medical School. "What the dermatologist does may appear quite effortless, but in order to be able to make that quick recognition, he needs a considerable amount of experience and training."

General conditions manifesting themselves in the skin run the whole gamut of disease.

The infectious diseases, such as smallpox and measles, dramatically announce their arrival through skin. Although the vast majority of these conditions are rare in North America, there are two exceptions. Syphilis and gonorrhea, venereal diseases, rank among the most common general diseases diagnosed by the dermatologist.

Said Dr. Thomas B. Fitzpatrick, Chief of the MGH Dermatology Service, Edward Wigglesworth Professor of Dermatology, and Chairman of the Department of Dermatology at Harvard Medical School:

"Of internal diseases, those perhaps of the greatest interest now are ones affecting the immune system. Skin is one of the organ systems affected by immunological disorders. Diseases like lupus erythematosus, dermatomyositis, and scleroderma all have expressions in the skin."

A cross section of normal human skin shows its complexity.

Drawing by Mrs. Edith Tagrin, © 1971 by Harcourt Brace Jovanovich, Inc. and reproduced with their permission from HUMAN DESIGN by William S. Beck.

A blowup of a wood tick shown glued to the head of a pin. His species is capable of carrying the organisms which cause Rocky Mountain Spotted Fever.

Lupus erythematosus and dermatomyositis are inflammatory diseases of certain (connective) tissue. Scleroderma is a chronic condition marked by thickening, hardening, and increased fiberlike growth, first in skin, and later in internal organs.

Of growing importance to the dermatologist is the diagnosis of genetic diseases. Tuberous sclerosis, for instance, can produce mental retardation and tumors or malformations in the nervous system of an infant. Not only do skin signs allow early diagnosis in children but also the spots characteristic of tuberous sclerosis may appear in parents who are symptomless carriers. Since there is a fifty-fifty chance that a child of a parent having the spots will develop the disease, discovering them and getting the parents to early genetic counseling is vital.

Most types of cancer, including such common varieties as lung cancer, may make known their presence by spreading to the skin. So do bacteremias, invasions of the bloodstream by bacteria.

In patients who have reacted badly to a drug, the body's covering often provides an important clue toward solving the problem. Skin can also be the tip-off in poisoning and chronic nutritional deficiencies.

By looking at skin, physicians often diagnose diseases disrupting the metabolism, the body's tissue-building and energy-producing processes. One such condition is hyperthyroidism. In the

person affected, a gland (thyroid) overproduces a hormone. Sent into the bloodstream, this substance causes sweating palms and itching. It also brings excessively rapid metabolism, weight loss, weakness, nervousness, and many other effects.

Some hyperthyroid patients have a substance deposited in their skin (often over the shins) which may lead to diagnosis of their condition. The same substance may at times displace their eyeballs forward and make them very prominent.

For some diseases, the dermatologist or general physician may be able to look at skin, take a biopsy, or both, and get a definitive diagnosis. For others, skin may point the way to further tests.

Early diagnosis through skin can be lifesaving. It *was* for a 14-year-old girl from the Massachusetts North Shore who came to the MGH in the summer of 1972 with a rash, fever, and headache. Her condition, in a general way, resembled a number of infectious diseases.

An MGH dermatologist examined her. Her rash, he found, had begun at her ankles and wrists. He immediately requested that she begin receiving tetracycline, an antibiotic drug.

The way her rash had begun was the danger signal. It is characteristic of Rocky Mountain Spotted Fever, an extremely rare disease produced by tiny organisms called rickettsia and transmitted to man by wood ticks. Untreated, this condition is fatal in seven to ten days.

Soon after the dermatologist's diagnosis, a biopsy showed the rickettsia in the girl's blood vessels. With treatment, she soon returned to full health.

One aspect of the case, however, continued to perplex MGH dermatologists: In Massachusetts, Cape Cod has been the only area reporting any incidence of Rocky Mountain Spotted Fever. Yet during that summer, the 14-year-old had been nowhere near the Cape. How had she contracted the disease?

On investigating, the physicians found that the family had earlier gone to Martha's Vineyard, leaving the girl at home. Her dog, however, had accompanied them. The pet had carried home the disease-bearing ticks.

Her French Accent Provided a Clue

When it comes to diagnosing internal disease, dermatology lends itself well to medical detective stories. The dermatologist's Sherlock Holmes-like powers of observation of the skin provide invaluable clues in difficult-to-diagnose conditions. Discovering the origins of these often rare and obscure illnesses sometimes requires a detailed investigation.

Recently a physician referred to an MGH dermatologist a woman suspected of having Addison's disease. This is a chronic disorder which occurs when a gland (adrenal) fails to produce adequate amounts of two hormones. The woman displayed what appeared to be Addison's disease's classic symptom: spontaneous and diffuse tanning.

When the dermatologist saw her, he discerned at once that her color was not the brown characteristic of Addison's disease; her skin was a bluish-gray. This pigment meant one of two things. She had contracted hemachromatosis, an iron storage disease, or some type of metal intoxication.

In talking to her, the dermatologist noted a slight French accent. Had she ever lived in France? She replied that she had. Had she ever taken nose drops, popular in France, which contained silver?

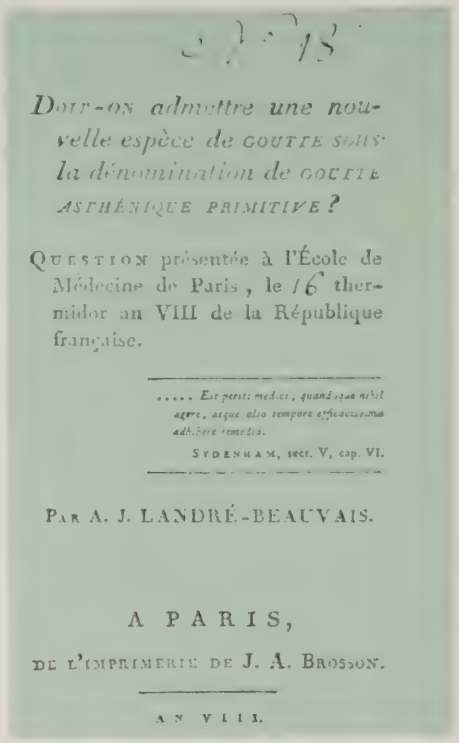
The physician had hit on her problem. Silver from the nose drops she had used throughout her childhood had stored in the same areas as the pigment cells of her skin. Although this condition, known as argyria, is neither serious nor reversible, the quick diagnosis had saved the patient from further worry and a costly series of tests for Addison's disease.

Rheumatoid Arthritis? Not in Ancient Bones!

(Continued from Page 1)

Before 1800 – except for Sydenham's writings in 1676 – the evidence becomes somewhat cloudy. And it was here that Dr. Short concentrated his search.

In studying reports on ancient human remains, the MGH physician found many instances of another independent but related form of arthritis called ankylosing spondylitis, but none of rheumatoid arthritis. Typical of his findings was the case of an Egyptian named Nefêrmaat, who lived around 2900 B.C. Sections of the man's spine, broken since death, showed that it had once been completely fused into a single rigid block, characteristic of what is found today as an end stage of severe ankylosing spondylitis.



Doit-on admettre une nouvelle espèce de GOUTTE sous la dénomination de GOUTTE ASTHÉNIQUE PRIMITIVE?

QUESTION présentée à l'École de Médecine de Paris, le 16 thermidor an VIII de la République française.

..... Est periti medici, quandonam nihil agere, atque alio tempore efficacissima adhibere remedia.

SYDENHAM, sect. V, cap. VI.

PAR A. J. LANDRÉ-BEAUVAIS.

A PARIS,

DE L'IMPRIMERIE DE J. A. BROSSON.

AN VIII.

When he delivered this thesis as a French medical student in 1800, Augustin-Jacob Landré-Beauvais was the first to set off rheumatoid arthritis as a separate entity.

A similar fate befell Cosimo de' Medici, the 15th-century financier, politician, and member of the famed Italian Medici family. After consulting a French pathologist's report on the man's skeleton, Dr. Short found that not only his spine but other joints were also affected. This sometimes occurs with ankylosing spondylitis.

(Down through history, a number of well-known figures have apparently contracted rheumatoid arthritis but were not within the scope of Dr. Short's study. They include: Pope Pius II [15th century], Christopher Columbus, Mary Queen of Scots, James Madison, the French painters Pierre Auguste Renoir and Raoul Dufy, and Clarence Day, the author of *Life With Father*.)

Since literature and art from the past might provide evidence of rheumatoid

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Ancient Arthritis "Cure": Torpedo Fish

(Concluded from Page 7)

arthritis, Dr. Short investigated this possibility. But both the Bible and Shakespeare, prime sources in this category, have failed to yield any useful information.

The MGH physician also tracked down potential evidence of the characteristic deformity of rheumatoid arthritis in a 15th-century painting. On seeing Botticelli's *Portrait of a Youth,* Dr. Short was interested to find what appeared to be characteristic finger-joint swelling in the youth's hand.

Later, however, Dr. Short pointed this out to an art professor friend. He informed him that Botticelli had typically painted the hands of his subjects in this way. The painting thus represents "an artistic convention rather than diagnosis of a disease."

In medical writings, arthritis and related conditions have earned scattered references since the time of Hippocrates, nearly 2,500 years ago. These ancient writers have referred to forms of arthritis with some resemblance to rheumatoid arthritis but have invariably confused their description with what are obviously references to gout, which is caused by an excess of uric acid in the blood.

The most likely ancient mention of rheumatoid arthritis comes from Soranus of Ephesus, an authority on obstetrics, gynecology, and pediatrics, who lived in Asia Minor in the second century A.D. But his accounts contain obvious references to gout which, in chronic form, may resemble rheumatoid arthritis.

An equally disappointing description originates with Scribonius Largus, who served as Julius Caesar's chief medical officer during the 54 B.C. Roman invasion of Britain. On returning to Rome, Scribonius set up a private practice and ascribed several permanent cures to an unusual treatment. This consisted of taking arthritic patients to a nearby beach and placing their feet on torpedo fish to give them a powerful shock of static electricity.

Not until he examined Dr. Sydenham's book which appeared in 1676, however, did Dr. Short find what he considers an airtight description of rheumatoid arthritis. Known as a careful, precise observer, the English physician authored many other classic disease descriptions.

Do the enlarged joints of his fingers represent the deformities characteristic of rheumatoid arthritis? No. The Italian master typically painted hands in this fashion.
Portrait of a Youth,
Botticelli,
National Gallery of Art, Washington
Andrew W. Mellon Collection

This drawing below by 19th-century French physician, Dr. J. M. Charcot, shows finger-joint deformities of rheumatoid arthritis. Note similarity to joints in above Botticelli.

Dr. Short cautioned that his is unlikely to be the last word on the antiquity of the disease since little of the evidence now available is solid enough to allow final judgment.

Coincident with publication of Dr. Short's study in the May-June 1974 *Arthritis and Rheumatism,* another investigator, a New Zealander, has unearthed a possible case of rheumatoid arthritis in the 11th century. If he is correct, the disease may be 500 years older than the MGH investigator's estimate.

The 11th-century patient is Emperor Constantine IX of the Eastern Roman Empire. Michael Psellus, an adviser to Constantine, gives in his memoirs a detailed description of how and when the disease affected different parts of the Emperor's body.

So disabled was Constantine by his illness that he had to be carried from room to room on a litter. When public occasions demanded that he ride in processions, two strong men walked beside him, holding him in the saddle. Carpets covered the parade routes, lest the horse stumble and the populace discover their emperor's disability.

While admitting that Constantine may have contracted rheumatoid arthritis, Dr. Short speculated that this may have actually been an unusual case of ankylosing spondylitis with extensive involvement of the joints of the arms and legs.

Yet unrecognized Arabian, Hebrew, or Chinese medical manuscripts, Dr. Short said, may also reveal new evidence, "but further study of ancient remains constitutes the most likely source of information to establish the true antiquity of rheumatoid arthritis."

In the meantime, the opinion of the Greek physician Aretaeus remains as correct today as it was nearly 2,000 years ago: The true causes of arthritis are known only to the gods.

MGH News

Vol. 34 No. 3 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1975

Cancer Myth Contrasts With the Brighter Reality

Buttressing Treatment With a Helping Hand

When chronic disease afflicts a child, the emotional impact on patient and family can be devastating. But for youngsters suffering from acute lymphocytic leukemia and for their parents, an unusual MGH clinic is offering a helping hand through a difficult period.

Employing a number of unique concepts, the Special Hematology Clinic buttresses relatively successful treatment with understanding and compassionate care.

Acute lymphocytic, the strain of leukemia most commonly affecting children, has yielded ground in recent years to a combination of radiation and drug therapy (column 3 story). Treatment, however, lasts for three years. It may be punctuated by relapses, infections, and resulting hospitalization. During this time the parents and child feel constantly threatened.

Dr. John T. Truman, an MGH pediatrician, launched the clinic in the belief that parents need more intense support than one physician alone can provide. Cooperating with him were Miss Ruth M. Farrisey, RN, Executive Officer of the MGH Clinics, and Miss Gellestrina T. DiMaggio, RN, Associate Director of the MGH Department of Nursing. They also felt that the inpatient nursing and medical staff, if they had more contact with outpatients, could gain a more realistic picture of the disease and its impact on the family.

As a result, a key element in the clinic is its nursing arrangement. An inpatient nurse clinician and a staff nurse of the MGH Children's Clinic compose the regular staff. Joining them for six-month rotations are two inpatient staff nurses, who learn about the problems which patients and their families encounter over the long run.

In addition an inpatient staff nurse assumes prime responsibility for the care of each child during both in- and outpatient phases of his treatment. The "primary" nurse serves as a kind of anchor for the family, guaranteeing support in a wide variety of situations.

In the two years since the clinic's inception, this arrangement has greatly improved the all-round care of its young patients.

(Continued on Page 5)

New Cox Center
Story and other photographs on page 6

Four years ago, a dejected young Colombian physician arrived at the MGH. He was suffering from an illness which he believed virtually incurable.

The condition which so depressed him was Hodgkin's disease, a cancer-like ailment.

After a six-month stay in Boston, the physician returned to his native land. His MGH doctor sent him special medications by air cargo. Recently, the Colombian made the last of several follow-up visits to the MGH. Free of his disease, he went home to begin medical practice in a mountain village.

Had he contracted the condition 25 years ago, his recovery would have been unexpected. But today, in sharp contrast to the young physician's expectations, many patients with Hodgkin's disease can look forward to an almost certain cure.

This disease is only one of several cancers and cancerlike conditions which patients are surviving in greater and greater numbers to lead normal, healthy lives.

The reasons for such progress, and its dimensions, vary from one cancer to the next. In each instance, however, one thing is clear: The concept of cancer as a single, inevitably fatal disease is a myth.

Doctors treating Hodgkin's disease have perhaps seen the most dramatic progress. The illness is marked by progressive enlargement of the lymph nodes, glands involved in the body's immune defenses. In the 1950s only about 35 percent of patients with this condition survived five years – a period used to assess cure in many forms of

(Continued on Page 2)

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EDITORIAL:

Needed: The Patient's Cooperation

Of the diseases which afflict Western man, none so terrorizes him as cancer. Cardiovascular diseases kill many times more people; arthritis cripples more; and mental illness affects more. Yet a diagnosis of cancer descends like a death sentence on the ears of the patient. Why does the very name of the illness strike such terror? Perhaps the hopelessness which pervaded treatment many years ago still plays a psychological role. Perhaps the ravages of the last stages of some forms of the disease have influenced us. The massive public education campaign of recent years may be partly responsible. And perhaps the loss of a loved one and a myriad of other factors are involved.

Despite the public attitude, if you strip cancer of its emotional content, what remains is a much brighter picture. For some forms, the cure rate has risen dramatically in recent years. For others, medicine has offered improved treatment which extends life in a meaningful way. New diagnostic tests make earlier treatment possible. And research offers the hope of new cures for some of the dozens of diseases which hide behind the single word "cancer."

A symbol of these advances and hopes is the MGH's Cox Center which is being dedicated next month. Under one roof the center will incorporate the most modern anticancer weapons: philosophy as well as understanding and caring, programs, physicians, nurses, allied health personnel, teamwork, sophisticated equipment, quarters, teaching, and research. The building is being opened in stages. Over the next few months most of it will begin operation.

Each day thousands of cars whiz along Storrow Drive past the massive cylinders and rectangles, slabs of concrete, and panes of glass which characterize the structure. In time this building – and others across the country – may come to symbolize the conquest of man's fear of cancer. Medicine can hasten that day with its continuing scientific onslaught on the disease. In the final analysis, however, the public holds the key. Thousands of persons contributed the millions of dollars necessary to make the Cox Center a reality. To give themselves a good chance to conquer cancer, however, they must give their doctor an opportunity to know they have it. Periodic physical examinations and prompt attention to warning signs lead to the early detection that so often results in a cure. Without the patient's active cooperation even a Cox Center is helpless.

Diagnostic Techniques Help Pave the Way For Better Survival

(Continued from Page 1)

cancer. Dr. Alan C. Aisenberg, an MGH physician specializing in the disease, estimates current five-year survival at about 85 percent.

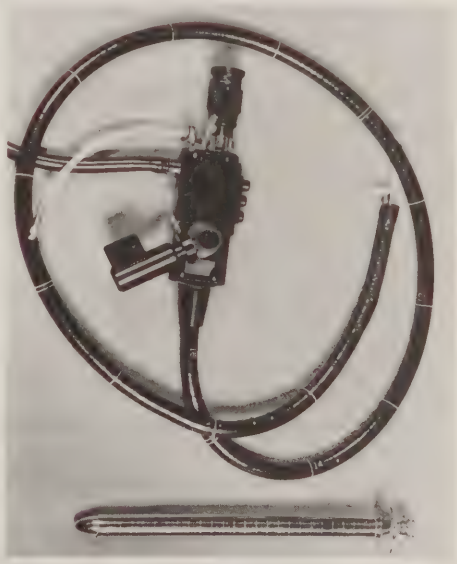
He attributed this change to a number of developments which have increased by steps the patient's chances of cure.

In the early 1960s, a new type of X-ray examination was developed. Lymphangiography, relying on a kind of dye which collects in the lymph nodes, reveals any spread of the disease to nodes in the abdomen. Usually beginning in the neck nodes, Hodgkin's disease affects other areas as it progresses.

Laparotomy, surgical exploration of the abdomen, has further improved diagnosis and taught physicians something new about the condition. The procedure revealed surprisingly large numbers of patients with disease in their spleens. Part of the same system as the lymph glands, this organ apparently acts as a kind of disease filter.

Both lymphangiography and laparotomy serve as pathfinders for the radiation therapist. They also indicate when

Photographs in this issue by
Joel Salhanick, Robert Crivello, and Niles Miller.



A sigmoidoscope (bottom) and a recently developed flexible colonoscope, used to detect precancerous growths.

the disease has spread too far for radiation treatment to succeed.

In recent years the two diagnostic techniques have helped physicians establish a standard system for measuring the extent of the condition. This yardstick has proved invaluable to physicians comparing notes on various treatments.

Doctors have failed as yet to agree on one aspect of Hodgkin's disease: whether it represents a true cancer, some type of inflammatory disease, or both.

In the early stages, radiation carefully aimed at one or two groups of lymph nodes involved may be best. When the condition is more advanced, however, medication is more likely to succeed.

And this arena has provided the latest progress against the disease. A combination of four drugs, each found somewhat useful by itself, has dramatically helped many patients. The combination is known as MOPP: nitrogen *m*ustard, vincristine (*o*ncovin), *p*rednisone, and *p*rocarbazine.

Dr. Aisenberg has found MOPP injections particularly useful in his younger patients. Most are in their late teens to late forties.

In much younger patients another type of cancer is yielding to treatment. Acute lymphocytic leukemia largely affects children 2 through 8 years old.

"Ten years ago, we knew that the average life expectancy for a child with this disease was 18 months," said Dr. John T. Truman, an MGH pediatrician who has devoted his practice to treating leukemia. "Now we expect that 50 percent of the children will live indefinitely."

The first years of life, Dr. Truman pointed out, are generally healthy ones. Next to accidents, however, cancer is the leading cause of death in youngsters under age 14. Leukemia is by far the most common form of children's cancer. Of those contracting the disease, about 20 percent have a type called acute myelocytic leukemia, which still has a poor outlook. Fortunately, the more treatable acute lymphocytic variety accounts for the remaining 80 percent.

In the acute leukemias certain types of white blood cells proliferate in the bone marrow, squeezing out the cells which normally grow there. If unhindered, the disease spills over into the central nervous system.

In the spinal fluid the rapidly growing cells produce meningitis, an inflammation of the tissues (membranes) covering the brain and spinal cord. By the time the cells are numerous enough to be detected in the spinal fluid, the condition is very difficult to control.

An MGH radiologist, Dr. Arthur C. Waltman, prepares to perform a lymphangiogram. The patient is a New Hampshire physician.

About seven years ago physicians theorized that before the children experience overwhelming disease in their central nervous systems, a handful of unseen cells must already lurk there, ready to multiply. Could one intervene, destroy them, and avert the dangers of leukemic meningitis?

In most instances, yes. The task falls to a highly successful drug and radiation grouping – injections of the anticancer medication methotrexate and high-dose radiation of the patient's skull.

A second major advance in leukemia treatment followed. Physicians noted that their young patients on medication suffered recurrent relapses. These occurred when the leukemia cells developed resistance to the single drug each child was receiving. To bring the disease back under control, the doctor would switch to another drug until it too lost its effectiveness. Eventually all possibilities would be exhausted.

Doctors at St. Jude Children's Research Hospital, a cancer center in Memphis, Tenn., devised a regimen in which patients receive five known leukemia drugs separately, but during the same time period.

At the MGH half the children with acute lymphocytic leukemia follow this system. Half are on a similar program devised by Acute Leukemia Group B. This cooperative study, which includes the MGH, also comprises some 25 teaching hospitals in this country and Europe. Both programs work, but the investigators in the study are trying to determine which is more effective.

Dr. Truman noted that medication groupings are also effective against two other childhood tumors. These are rhabdomyosarcoma, composed largely of muscle cells, and Wilms' tumor, which arises in the kidneys.

The most common site for cancer is the skin, where some 18 percent of all cancers arise annually. The most treatable skin cancer is malignant melanoma, abnormal growth of the melanocytes, cells which produce skin pigment.

"There are three types of malignant melanoma: lentigomaligma, superficial spreading, and nodular," said Dr. Martin C. Mihm, an MGH dermatopathologist. "In this country, 65 to 70 percent of melanomas belong to one of the first two types. Both have prolonged intra-epidermal [within the skin] growth phases, during which they have little, if any, potential for metastasis [spread], and during which they are essentially curable by surgical excision."

The nonspreading phase lasts from 5 to 15 years. One MGH patient, as documented by photographic evidence, had a tumor in this stage for 52 years.

For both patient and physician the problem is one of identifying the melanoma early, before it does irreparable harm.

(Continued on Page 4)

A Fourth Major Weapon Against Cancer?

(Continued from Page 3)

To begin with, the cancer resembles a harmless mole or freckle. In the past many physicians looked on bleeding, ulcerating, or rapid darkening as the first signs of trouble. By the time these occur, however, the disease has already invaded other tissues.

In 1967 MGH dermatologists, surgeons, and pathologists including Drs. Thomas B. Fitzpatrick, John W. Raker, Ronald A. Malt, Wallace Clark, and Mihm launched a major campaign to educate physicians and other health professionals on how to recognize early melanoma. Such efforts are under way around this country and in Australia, which has the highest incidence of malignant melanoma in the world.

The MGH doctors and an Australian physician compiled a color atlas showing different types of the skin tumor. The atlas appeared in the *New England Journal of Medicine* in 1973.

The basic clues to the presence of malignant melanoma are irregularities in color, border, or surface. Red, white, and particularly blue specks in brown or black "moles" are warning signs. So are uniform bluish-black, bluish-gray, or bluish-red colorings. Many skin cancers exhibit "notched" edges. Uneven surfaces characterize a number of melanomas, although some are smooth-topped.

Like melanoma, most cancers respond better to treatment if detected early. In many instances, diagnostic techniques, even in the absence of new treatment methods, have paved the way for longer and better patient survival.

One of the oldest cancer success stories is the Pap test or smear. Developed by Dr. George N. Papanicolaou in 1942, this procedure allows the cytologist to detect cervical cancer cells before the patient has symptoms.

Although some populations still fail to undergo this test, many women now request it when they have a checkup. For every 1,000 patients tested, said Dr. Priscilla D. Taft, who heads the MGH Cytology Laboratory, cytologists detect some two to six cancers, most of them at an early stage.

The procedure involves removing some of the loose cells which are shed from the cervix, uterus, and vagina. The cell types seen by examining the smear under the microscope show whether or not cancer is present.

For doctors treating breast cancer the Pap test experience has become a model. Like cervical cancer, breast cancer has a very early precancerous stage at which surgical excision of the growth alone may halt the disease.

When the cancer progresses further, surgery to remove the breast, mastectomy, may become necessary.

New diagnostic techniques are making detection possible before the conventional approaches, X ray and physical examination, even hint that something is wrong. One promising procedure is thermography. By measuring the heat characteristics of the breast, the process detects slightly "hotter" tumor areas.

More proven in its usefulness is xeroradiography (April 1974, *MGH News*), a type of X ray which relies on the same basic principle as the office copier. Breast cancer screening centers, utilizing this and other techniques, are springing up around the country.

Another type of X ray, rivaling xeroradiography in its sensitivity, is helping to detect brain tumors. The computed tomography, or EMI, scanner (September 1974, *MGH News*) can precisely measure slight variations in the density of the brain's soft tissues.

Malignancies (cancers) of the colon and rectum, which together are the most common internal cancers affecting both sexes, have also become vulnerable to earlier detection. Their nemesis is the sigmoidoscope, a tubular instrument which actually allows the physician to inspect the lower bowel. Precancerous polyps (nodules) so detected are often small enough to be completely cured by surgical removal of the growth alone. In more advanced disease removal of a section of the colon may be required.

Although sigmoidoscopy is nothing new, it has until recently limited this diagnostic approach to the lower 10 inches or so of the colon. The recent development of the flexible colonoscope permits the advantages of early detection and removal to be extended to the entire six-foot length of the colon.

On the treatment front, massive research efforts are beginning to pay off in a flurry of developments. Most of these have appeared so recently, however, that they are still undergoing critical evaluation.

Investigators have reported promising, though very early, results – especially in breast cancer – with a drug called adriamycin. Another medication, daunamycin, has received similar evaluations.

Surgery belongs to the classic trio of cancer treatments.

Adriamycin has also joined a four-drug combination used for Ewing's sarcoma, a rare and unusually rapidly fatal bone cancer. When allied with high-dose radiation in a National Cancer Institute study, these medications offered patients with early disease a 50 percent chance of surviving five years.

Since the 1950s, radiation has produced encouraging results with patients suffering from a certain type of testicular cancer. Later, application of extensive surgical procedures to remove potentially involved lymph nodes proved exceedingly effective in increasing survival. In addition, dactinomycin and other drugs more than doubled the number of survivors when used for people with these kinds of malignancies.

Urologists are now using X-ray treatment before extensive surgery to aid persons with fairly advanced bladder cancer – that which has invaded surrounding muscle.

The National Bladder Cancer Project, Collaborative Group A, chaired by Dr. George R. Prout, Jr., Chief of the MGH Urology Service, is following up on earlier studies that indicated the value of this combined treatment.

Medication proves useful against a bone tumor called osteogenic sarcoma, according to Dr. John W. Raker, Chairman of the MGH Tumor Clinic. He also pointed out the effectiveness of

cryosurgery (extreme cold) in selected cases of oral and skin cancer.

Some of the greatest new benefits to the cancer patient, Dr. Raker said, come from combining treatments. For example, it is becoming clear that many oral cancers can be better controlled by combining radiation therapy and surgery than by using either treatment alone. Advances in plastic surgery now permit successful reconstruction of function and appearance after radiation and removal of large oral cancers.

Medications, surgery, and radiation are the classic trio in the treatment of cancer. But a fourth major instrument, immunotherapy, may soon take a place beside them. Dr. Truman described the general theory behind this approach:

"All of us who are well are presumably free of tumor because we have a built-in defense system of immunocytes [immune cells] which protect us against malignant proliferation. But the unfortunate patient who develops cancer does so because his defenses have failed.

"If we can destroy the vast majority of his malignant cells with surgery, radiation, or chemotherapy, perhaps we can then stimulate his defenses to go the final mile in eradicating his own tumor."

Investigators are now testing this approach in a variety of diseases.

Finally, while the creation of new methods of attacking cancer receives much emphasis, the key to its defeat may lie in tools already available.

Making this point while agreeing that cancer has gained an undeserved place in the fears of many, Dr. Howard Ulfelder, MGH Deputy to the General Director for Cancer Affairs, said:

"It is a curious quirk of circumstance that of all the major diseases, cancer can be eradicated so completely that a significant percentage of patients are restored essentially to their former state of health. Indeed, for persons with localized cancer the long-range outlook for good health is better than for those with conditions like cardiovascular and cerebrovascular disease, arteriosclerosis, cirrhosis [a liver disease], nephritis [a kidney condition], and generalized arthritis.

"Moreover, while the rate of five-year survival without disease for all cancers is now 33 percent, it can be shown that this could be increased to 50 percent by application of what we already have available in the way of diagnostic and therapeutic techniques."

While the youngster's mother and uncle look on, Dr. John T. Truman examines a patient in the Special Hematology Clinic.

The Little Girl Had a Nurse Who Knew Her

(Continued from Page 1)

Better knowledge about the disease and the effects of chemotherapy has helped impress on nurses the vital necessity of safeguarding against infection, the greatest danger when the child first enters the hospital. Infection is an ongoing problem throughout his illness.

The clinic staff has also become more sensitive to parental needs. For instance, when the child first arrives at the hospital, the nurses have found it best to spare the mother and father the details of the disease, reserving them for later when the parents can digest them.

Working closely with the parents, the staff can sometimes help a youngster avoid the emotional trauma which often accompanies hospitalization and separation from family.

The parents of one six-year-old reported that on first returning from the hospital their daughter suffered from nightmares and other ill effects. After coming to the MGH clinic, the little girl again entered the hospital. This time, however, she had not only a friendly nurse but also one who knew her, and she returned home without problems.

A number of cancer centers rotate inpatient staff nurses to an outpatient setting to give them a change. The MGH uses such a rotation, but to give a patient one nurse for the whole period of the illness.

The Special Hematology Clinic also puts unique emphasis on the care that parents can provide the child at home. This helps reduce the number of hospitalizations.

The nurses teach parents how to watch for and prevent mouth ulcers, a common side effect of the powerful antileukemic medication. Parents also learn to monitor their child's temperature constantly. Fever could signal infection.

The clinic's main emphasis, said Nurse Clinician Genevieve Foley, RN, is on helping the youngster to live and grow as normally as possible.

Families are tempted, she explained, to overprotect the child, lavishing special attention on him. Parents find it difficult to accept that their youngster can play outdoors, attend school, and do most things which healthy children can.

"It's the subtle difference," Miss Foley said, "between saying, 'Here is a leukemic who is five years old,' and, 'Here is a five-year-old who has leukemia.' "

The clinic encourages families to plan for the child's life, such as preparing him for nursery school. The staff also assists parents in coping with the side effects of the medication. These usually include weight and hair loss, followed by weight gain and hair regrowth.

To help keep their young patients in

(Concluded on Page 6)

One Roof, a Broad Spectrum of Services

Scheduled to be dedicated next month, the MGH Cox Center will phase into operation just in time to alleviate a crushing demand on the hospital's radiation medicine services.

In the three years the building has been under construction, the hospital has found it increasingly difficult to provide radiotherapy for its cancer patients.

One of five new radiotherapy devices of various types has already been installed in the building's basement. The other four will take their places there later in the year.

As recognized by the state when it issued a Certificate of Need for construction of the $16-million center, the structure will fill a broad spectrum of patient requirements without including any beds.

"The building is intended," said Dr. Howard Ulfelder, MGH Deputy to the General Director for Cancer Affairs, "to offer patients, having or suspected of having cancer, an efficient, attractive, and emotionally acceptable access to whatever is necessary for best management and which can be delivered on an ambulatory basis."

By placing the bulk of its cancer specialists under the Cox Center's one roof, the MGH will facilitate as soon as possible the best treatment for each patient by specialists functioning as a team. Since the new building is connected by corridors to the main MGH complex, patients will have easy access to any care needed for noncancer-related problems.

Whether inpatients or outpatients, everyone coming to the center will receive personalized attention. For all patients, both private and clinic, the facility will follow the same procedures and offer the same physicians.

John E. Lawrence, Chairman of the Board of Trustees, and Dr. Charles A. Sanders, General Director, expressed the hope that the building will become a visible reminder that prompt diagnosis of cancer usually leads to a cure.

The structure itself is architecturally somewhat unusual (December 1971, *MGH News*). Since pillars replace interior walls in supporting the building, inside walls are easily moved. The outside walls come in modular sections. These can be interchangeably glass, louvers, or plain siding depending on the new cancer roles that may develop in the years to come.

The center's first three floors will house radiotherapists, medical and surgical oncologists (tumor specialists), nurses, and ancillary personnel. While there will be no operating rooms, surgeons can use the numerous examining rooms to see their patients. These floors will also include waiting areas, offices, and a teaching amphitheater.

Cancer research will play a major role in some of the laboratories that will occupy the remainder of the building.

Among the studies will be extensive investigations under Dr. Herman D. Suit, Chief of the MGH Radiation Medicine Service. One floor of the building will house 13,000 special research mice (November 1971, *MGH News*).

Respiratory therapists and radiation physicists will also occupy space.

Although many floors of the Cox Center are not expected to open until much later in the year, a ceremony dedicating the new building will take place May 11. Officiating will be Mrs. William C. Cox, in whose husband's memory it was named, and the Right Rev. Henry K. Sherrill, former Episcopal Bishop of Massachusetts.

A Helping Hand

(Concluded from Page 5)

the mainstream at home, the nurses suggest that the whole family come along on clinic visits. Of necessity, these are frequent. Parents are also welcome to help with the various procedures which their children must periodically undergo. For example, during a lumbar puncture (the removal of a sample of spinal fluid), being held by his parents comforts the child.

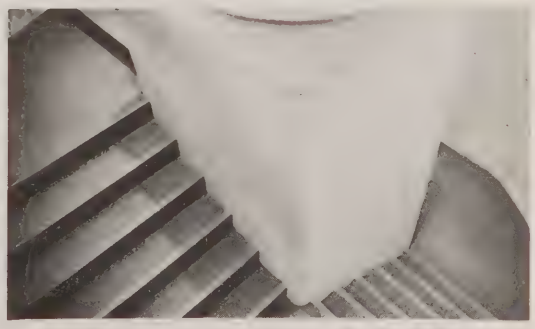
The Special Hematology Clinic approaches every task in a very personal way. The unit fosters a tight-knit group of parents who share hopes and disappointments. If a child succumbs to the disease, every parent of a clinic patient learns the news privately from the staff member closest to him.

Although the facility is designed specifically for patients with leukemia, its beneficial effects have pervaded other areas. From their clinic experiences, Miss Foley said, nurses have gained insights which help them provide better care to all young patients in their charge.

C. Clifton Ling, Ph.D., and Karen P. Doppke, M.S., MGH physicists, calibrate a cobalt-60 unit for cancer radiotherapy.

Dr. John W. Raker, Chairman of the MGH Tumor Clinic, inspects an examining room.

The waiting area



A stairway

From Quiet Meetings to a Pioneering Clinic

Soon after the turn of the century, an MGH radiologist almost accidentally planted the seeds of a clinic which was to lead the nation in revolutionizing the treatment of cancer.

The radiologist, Dr. George W. Holmes, wanted to find out if the tools of his fledgling specialty might prove useful in treating skin cancers. For help, he approached Drs. C. Guy Lane, a dermatologist, and Robert B. Greenough, an MGH surgeon. The three decided to meet regularly to compare the relative merits of radiation and the only treatment then known for skin tumors, surgery.

These quiet, informal gatherings grew, attracting physicians from several other specialties and examining other forms of cancer. By 1925 some 20 doctors had become involved.

That April – 50 years ago this month – the MGH officially designated these meetings as the Tumor Clinic. Believed to be the first of its kind in the country, the clinic has served as a model for hundreds of similar units. It began a half century of treating cancer by pioneering two concepts.

"To begin with, the clinic's unique feature was the notion that multiple disciplines should be brought to bear on the planning for and execution of treatment for people with malignant disease," said Dr. John W. Raker, an MGH surgeon and Chairman of the Tumor Clinic. "In general, this has been the established mode of operation here ever since."

For the cancer patient, a team of specialists can provide what a single physician alone cannot: expertise in a variety of treatment methods. Any of these or a combination of several might prove successful for a given patient.

The clinic's 75-member medical staff consists of radiotherapists, surgeons, and doctors expert in cancer chemotherapy (drug treatment). Also included are diagnostic specialists such as radiologists and pathologists. Recently the facility added a psychiatrist concerned with the special emotional problems of cancer patients.

"A second thing the clinic has done is to emphasize the need for long-term follow-up of patients in order to gain accurate awareness of the success or failure of a given form of treatment," said Dr. Howard Ulfelder, MGH Deputy to the General Director for Cancer Affairs. "And it emphasized that this follow-up should include every single case of cancer seen in treatment."

The Tumor Clinic Case Registry is a key ingredient in follow-up activities. It tracks every patient who receives cancer treatment at the MGH, whether he goes to the clinic or not.

"The registry," Dr. Raker said, "tries to provide certain basic information about each of these people, what their problem is, and what treatment was given. In this way the registry builds up a body of knowledge about each treatment and each type of tumor."

The registry evolved from one of a series of pioneering concepts of Dr. Ernest A. Codman (February 1972, *MGH News*).

Layer by thin layer, the registry has built up information which has helped physicians select the best treatments. The MGH registry has also inspired the establishment of others throughout the nation.

In addition to providing care and furthering research, the clinic has served as a training ground for those treating cancer. Countless physicians, nurses, social workers, and technicians have benefited in knowledge and skill.

Over the last half century, the basic facts of the Tumor Clinic's approach have gone virtually unaltered. True to its pioneering beginnings, however, the unit has remained flexible and dynamic.

In modernizing its operations, it is now computerizing registry files. When complete, this process will put volumes of useful information within easy reach of physicians.

The facility has also subtly altered its emphasis. Dr. Raker, who is a Harvard Medical School Associate Clinical Professor of Surgery, said:

"When the clinic started, I think that the notion was probably to choose the best treatment from among those methods available. Now we are devoting a considerable amount of time to developing new methods."

Physicians are today more likely to regard the various treatments as possible allies than alternatives.

A major change still to come will imbue the clinic's half-century observance with special significance. During the spring and summer, the unit is expected to move into the new MGH Cox Center (see page 6 story). The clinic will begin offering patients more personalized private care. To reflect its changing role, the facility is already acquiring a new name: Cox Center Ambulatory Services.

Does that mean that the original precepts of the Tumor Clinic are growing obsolete? Hardly.

"The clinic is the stage," said Dr. Ulfelder, Joe V. Meigs Professor of Gynecology at Harvard Medical School. "The stage doesn't change much from performance to performance, although the play may. Without the stage, there wouldn't be any play. Without the Tumor Clinic, there wouldn't be anything like the opportunity to provide care and improve it."

The cofounder and first Chief of the Tumor Clinic, the late Dr. George W. Holmes, looks over an X ray.

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A Reward for Having a Physical?

An MGH psychiatrist who took part in a study showing that people ignore the early signs of cancer thinks that industry might have a partial solution to the problem of delay.

The psychiatrist, Dr. Thomas P. Hackett, Acting Chief of the MGH Department of Psychiatry, is basically pessimistic about educational efforts to shorten delay in getting periodical checkups.

"To induce people to seek annual physicals, a system of rewards, penalties, or both might help," he said.

He noted that many corporations require regular examinations of their top executives. So do the armed forces and some universities. Industry could require annual physicals of all employees. Another possibility: Employers might also try offering some sort of reward to workers who are regularly examined by their physicians.

Dr. Hackett's study was reported July 5, 1973, in the *New England Journal of Medicine*. Other authors were Drs. Edwin H. Cassem, an MGH psychiatrist, and John W. Raker, an MGH surgeon.

The article indicated that a massive half-century effort to educate the public about cancer has failed. Despite the knowledge that early treatment usually leads to cures, the number of people delaying has virtually frozen in the last 50 years.

The study showed that only 33.7 percent of patients consulted a physician within four weeks of detecting something wrong. By comparison, a similar survey in 1933 revealed that 29.4 percent saw a doctor at once.

Why cancer education has had so little impact is difficult to determine, but Dr. Hackett offered some thoughts:

"Information or knowledge does not always produce a logical train of events. Simply because a woman feels a lump in her breast does not automatically mean she will see a doctor. She may stop bathing or touching the breast just to keep the growth out of mind. We are not, after all, a logical species.

"She may want to think it's a cyst, which will go away with her period in two weeks or a month. She might feel the lump is too small to be a cancer. She may be afraid that her physician may call her a hypochondriac. Or she might have a fatalistic attitude, a very foolish thing – one correctable by education.

"Fear is one of the primary factors – fear of finding out that something is indeed wrong with you, fear of needing hospitalization, fear of an alternate pattern of living, and fear simply of being sick."

Not uncommonly, a person who has pain or some other glaring symptom immediately thinks of cancer, but dismisses the thought, and does nothing about it simply because it is too terrifying to contemplate. Being under evaluation often means expecting cancer with instant death – a totally erroneous notion.

Dr. Hackett suggested that one way to reach this person might be through a friend or spouse. The delaying patient, he said, often confides his problem to another. If this "confidant" literally pushes the delayer into seeing a physician, it may save his life. Dr. Hackett said that a person close to the patient should even call and make a doctor's appointment for him, if he proves resistant.

"It's one thing for a person to acknowledge that he's sick," the MGH psychiatrist said. "That's very hard to get him to do. But it's not all that difficult to get a second person to agree that the illness is present."

The problem of delay in cancer, the MGH psychiatrist said, may have roots in a more basic problem: failure to undergo routine tests and physical examinations. The MGH study on delay showed that most cancers treated at an early stage are discovered through these approaches. Experience teaches, however, that such examinations are thankless, unpleasant, and often expensive.

"What are the rewards?" Dr. Hackett said. "You go to a doctor. Most people are frightened. In the back of their minds, there's always a sneaking suspicion that they have something wrong with them. Afterward, at best, they're given a clean bill of health and a bill for $50. To a lot of people, a clean bill of health is not worth $50.

"By requiring an annual physical and offering a reward, industry might present a very needed added incentive and save countless months of sick time as a result."

Mrs. Marilyn G. Nutter, an MGH Cytotechnologist, prepares to examine a Pap-smear specimen. Could some type of reward induce more women to undergo the lifesaving test regularly?

MGH News

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"Undiversion" Means a Normal, Unrestricted Life

When the telephone jangled the other day in the office of an MGH surgeon, the call was from Mexico City. The mother of 15-year-old Jorge wanted to know whether her son could go swimming. On the face of it, hardly a momentous matter. And yet Jorge, who underwent surgery recently at the MGH, had never been swimming in his life.

At birth there was blockage of the Mexican boy's urinary tract, causing his kidneys to swell. When he was 2 weeks of age, surgeons operated to divert the flow of his urine. It then drained from his kidneys through the wall of his abdomen into three bags. It was thought that Jorge would have to wear those bags for the rest of his life.

Last fall, however, Jorge's local physician referred him to the MGH. The Mexico City doctor had learned of the hospital's success in reconstructing the urinary tracts of youngsters who had previously undergone "diversions."

In the past six years, Dr. W. Hardy Hendren III, Director of Pediatric Surgery at the MGH, has performed 40 such "undiversions." Ranging in age from 2 to 18 years, the patients have come from all over America. In 32 of these operations, the children had "permanent" diversions. The remainder had procedures designed to be temporary. Yet even these had been present for two to three years. All 40 patients have been able to return to using their bladders normally.

Jorge's undiversion came in January. Proving arduous and complex, the procedure lasted 11 hours. As often happens in such patients, Jorge's ureters,

(Continued on Page 2)

Did Simple Speech Really Doom Neanderthal?

Although the last of his kind has been dead some 45,000 years, Neanderthal man has become quite a controversial fellow.

Among anthropologists the mere mention of his name may be enough to spark a heated dispute.

Most of the controversy centers on the place he occupied in evolution. Was he, as some scientists believe, an ancestor of modern man? Or as others proclaim, does he represent the last of a line of manlike creatures which branched off the mainstream of evolution about 200,000 years ago?

Giving weight to this view is a hypothesis advanced recently by two American scientists. Philip Lieberman, Ph.D., a linguist at Brown University, and Dr. Edmund Crelin, an anatomist, of Yale University School of Medicine, proposed that Neanderthals lacked modern man's ability to articulate certain sounds. Thus prevented from developing a complex language and the social structure which goes with it, Neanderthal man died out.

Given the fairly well-established shape of his jaws and skull, the scientists argued, Neanderthal could not have possessed a vocal tract capable of producing the vital sounds.

Not so, says an MGH radiologist. In a scientific paper published in January, Dr. Marjorie J. LeMay asserts that some modern men display the same anatomical features. Yet these people can speak quite articulately. Among the persons she cites is a man sufficiently articulate that he became a physician.

Dr. LeMay also disputes another suggestion by Drs. Lieberman and Crelin: that Neanderthal man's brain may not have developed sufficiently for speech as we know it. Comparing modern brains to the impressions left on the inside of the skull of a Neanderthal, she found evidence that the brains of both were equally developed.

Although Dr. LeMay is not the first to argue with Drs. Lieberman and Crelin, whose findings have met with criticism from linguists, anatomists, and

(Continued on Page 7)

A Pokot woman folk doctor. Inserted in her lower lip is an ornamental wooden plug. (Story on page 8.)

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EDITORIAL:

An Image That Deceives

A Mexican boy needing a highly specialized, innovative urologic procedure comes to the MGH. A vacationing scientist journeys to Africa in search of new pharmaceuticals that can be adapted to American medicine. Stimulated by the intellectual challenge, a radiologist devotes her spare time to researching and writing about a subject far removed from her customary role. These are the topics of three of the articles appearing in this issue. Although 60- and 70-hour weeks are commonplace at the MGH, its doctors somehow find time occasionally to indulge their whims in exotic searches for new treatments or even to merely satisfy intellectual curiosity. It is this kind of ferment which makes the Massachusetts General Hospital an exciting place. And it is this very excitement that generates, stimulates, challenges, and provokes its employees to find the best ways to care for their patients.

Often the exotic attracts attention. That simple fact helps explain why it is the Mexican boy – not the Charlestown child – whose care commands the headlines. Yet there is a very different face to the MGH. While some of its patients journey on medical pilgrimages from all parts of the world, the local residents predominate. The famous patients from afar help conceal the fact that Boston residents make up 44 percent of the outpatients and 28 percent of the inpatients. And 89 percent of the inpatients reside in Massachusetts.

Still another myth proclaims that the MGH serves primarily the wealthy and famous. Again the headlines tend to focus on the government leaders, foreign royalty, and well-paid athletes and movie stars treated here. In point of fact, however, MGH patients represent a cross section of Americans. While middle-income patients predominate, the poor and the medically indigent represent more than one in four of those admitted. Most patients have some form of health insurance, but hundreds are unable to pay and do not. Even in good times the hospital writes off $3 million in bills either never sent or sent but unpaid. In times like these, debts mount even more. If all of this seems far removed from the image of the MGH as a giant that caters to the wealthy and famous, it is.

After Undiversion Stubborn Infections Usually Clear Up

(Continued from Page 1)

the tubes which carry urine from the kidneys to the bladder, had been almost completely removed.

To bridge the distance between the kidneys and the bladder, Dr. Hendren fashioned a substitute ureter from the boy's intestine, tapering it to the right size.

Following surgery, Jorge quickly adapted to using his bladder. After a month he left the hospital. A week later he returned to Mexico where he was delighted to learn that the local swimming pool was no longer off limits.

For youngsters like Jorge, who faced a lifetime of wearing bags at their sides, undiversion has wrought dramatic changes.

Prior to surgery one 12-year-old boy threatened to commit suicide unless he was rid of his bag. Difficult and troublesome, he was skimming by at school. Undiversion transformed him into a pleasant and cooperative lad. He became an excellent student.

Following undiversion one 16-year-old girl began dating for the first time.

A mother reported that while her 14-year-old son found difficulty in adjusting to no longer being the center of attention, he soon discovered a new life. Entering his first year in high school, he participated in sports, from which his bag had until then excluded him.

Another mother, an operating room nurse, wrote of her 13-year-old boy:

"Since reconstructive surgery in 1973, his mental attitude and morale have improved 100 percent. . . . His school grades went up from average to honor-roll standing, and he no longer avoids showering with the boys in gym class. To us, the biggest surprise which showed the depth of his feelings was when he said, 'Gee, now I can get married.' "

Besides improving the quality of life, undiversion carries medical advantages. With openings in their abdominal walls many children suffer from long-term urinary infections. When their bladders function normally again, these infections usually clear up.

Some of these patients have kidney problems which will eventually make transplantation necessary. Dr. Hendren believes that undiversion will forestall

this day and better prepare the patient for a transplant.

Urinary diversions came into use for children during the 1950s, primarily to help newborn infants with two types of problems: obstruction of the urinary tract and neurogenic (disordered because of nervous-system abnormality) bladder, the result of a spinal defect. In performing undiversions, surgeons employ a variety of approaches.

Dr. Hendren emphasized that today diversion is still the best treatment in many cases of neurogenic bladder.

"However, in recent years," said the Professor of Surgery at Harvard Medical School, "reconstructive techniques for most urinary disorders have improved greatly so that today the majority of these children that we see are treated with an initial reconstructive operation instead of some type of diversion.

"This success in repairing severely deranged urinary tracts in children prompted us to be on the lookout for youngsters who had been treated in past years by diversion. By applying techniques developed in the last ten years, it has been possible to 'undivert' the urinary tract in these children."

Dr. Hendren stressed that one of the most important advances in the surgery of children came from Dr. Wyland F. Leadbetter, the late Chief of Urology at the MGH. With Dr. Victor Politano, now at the University of Miami, he devised a method for joining the ureters to the bladder which is used the world over today and the principle of which is a vital part of these undiversions. This involves joining the ureters or bowel segment to the bladder in a way which does not permit backwash, or reflux, which damages the kidneys.

Showing 5-year-old Matthew Wilson his X rays, taken before and after undiversion, are his mother, an X-ray technician, and father, a radiology resident.

The precise methods employed in an undiversion vary from one patient to the next, but usually they are long procedures, lasting 6 to 8 hours or more.

At several hospitals, other surgeons are now performing similar procedures.

Because such surgery requires a high degree of specialization, undiversion will probably be confined to major medical centers. The operation entails a complexity comparable to difficult kinds of open-heart surgery in infants.

Undiversion also demands other skilled team members, including a pediatric anesthesiologist, a nephrologist (kidney specialist), and an infectious disease expert to deal with the stubborn urinary tract infections which often plague youngsters with diversions.

How many children in this country are now candidates for undiversion? No precise figures exist, but Dr. Hendren estimates that these patients must number at least in the hundreds.

Advances in reconstructive surgery, however, appear to be reducing the number of new diversions. Writing in the *Annals of Surgery* on this subject, Dr. Hendren concluded:

"We believe that many children . . . could . . . be treated by direct reconstruction," instead of urinary diversion.

For these youngsters also, Dr. Hendren said, initial reconstruction, like undiversion, would bring a far superior quality of life.

Following undiversion, Matthew Wilson (left) of Cincinnati, William (Chip) Thorpe of Albany, N.Y., and Jorge Aranda of Mexico City as they were about to be discharged from the MGH.

Photographs in this issue by
Frank P. Castronovo, Jr., Ph.D.
Dale R. Wickberg

A Climbing Vine Is Said to Relieve Malaria

(Continued from Page 8)

Cherisa removed it, checked the forearm, and reapplied the cast declaring a few more weeks were needed for proper healing. Thereafter, he agreed to be interviewed under the village's favorite tree."

Dr. Castronovo elicited his comments on medicine. Claiming to be a good surgeon, the folk doctor said that prior to operations he induced a slight euphoria and dizziness in patients by clapping his hands over their ears. The Cherisa offered a diverse list of conditions that he treats. These included broken bones, diarrhea, colds, earache, rheumatism, and wounds. For the latter, the Cherisa used a dressing of butter, salt, dirt, and cattle dung.

The folk doctor also mentioned a number of herbs used for such purposes as covering wounds and burns, and quelling pain. When asked what payment he would like for the time spent explaining his methods, the Cherisa requested a bar of soap.

For their health needs the people of Iyya Duba depend almost entirely on self-treatment and the Cherisa. Only when his methods fail, do they reluctantly seek help from the area's Italian missionary hospital.

The total eclipse, coming at the midpoint of the scientists' stay in Iyya Duba, made a deep impression on its inhabitants. Over the last 1,000 years, the Borana have evolved an elaborate time-reckoning system based on the moon and the stars. The tribespeople thus impart great meaning to anything which occurs in the sky.

Before the eclipse the Kenyan government sent soldiers to warn all the peoples of the Marsabit region not to look at the sun "when it dies."

"When the eclipse first started," Dr. Castronovo said, "Iyya Duba [the principal elder who shares his name with the village] stood at the center of the settlement and shouted commands to his tribal members. He told his people to seek protection within their huts and fearing that a 'spirit' would kill the livestock, instructed that the animals be brought into the protective confines of the corral."

The elder ordered the villagers to lie down and go to sleep. Night was approaching, he explained. With frightened looks, the inhabitants hurried to shelter, taking with them their machete-like weapons.

The Borana fashion casts like this one from cloth, sticks, and twine, and apply them for fractures.

When the sun shone fully once more, the scientists discussed the phenomenon with the assembled villagers. A number of tribesmen suggested that the Europeans and Americans had "killed" the sun. By virtue of having known about the eclipse beforehand, the Kenyan government also came under suspicion.

One Borana participant had heard a rumor in another village that the Americans had recently landed men on the moon. Was this true? If so, he postulated, the Americans could have somehow pushed the moon in front of the sun.

Afterward the women of the community danced to celebrate the eclipse's passing. To divine what the phenomenon portended for the future, the elders of a nearby village examined the entrails of a bull. Their conclusion: the future would bring peace and rain.

During their stay in Iyya Duba, Dr. Castronovo and his party chanced to see the famed Ahmed, an elderly bull elephant that lived under the Kenyan government's protection. A symbol of national pride and independence, he was allowed to roam wherever he chose.

When the scientists attempted to photograph Ahmed, they aroused the distrust of two soldiers of the elite Kenyan Rifles assigned to guard him. The soldiers were poised to retaliate for this intrusion on Ahmed's carefree existence. The eloquence of Iyya Duba (the elder), however, saved the photographers.

Ahmed, believed to have reached 75 years of age, died in January 1974.

Several months later, in the summer of 1974, Dr. Castronovo returned to Kenya, but this time visited the Pokot, who live in the west central section near the Ugandan border. The drought had not affected this area as heavily as the Marsabit.

On this second trip Dr. Castronovo was better accustomed to conditions and was able to conduct a more in-depth survey of native medicines and their uses. His hosts turned out to be different in many ways from the Borana.

Colorful dressers, the Pokot wear

After interviewing the Cherisa, or Borana folk doctor, Frank P. Castronovo, Jr., Ph.D., relaxes in the shade with him and chews a "toothbrush stick."
(Photo Courtesy of Educational Expeditions International)

One Borana child carries another among the grass huts of the village of Iyya Duba.

copious jewelry and ornaments. Some of the women drape themselves in 15 to 20 beaded necklaces and decorate themselves with ornate patterns of scars. The men preen themselves constantly and always carry with them two spears and a "wife-beating stick." The more traditional among both men and women have a hole "drilled" in the lower lip and a wooden plug inserted.

Dr. Castronovo visited two Pokot villages. One depends largely on livestock for survival; the other, 60 miles away, relies on cultivated crops.

He found the inhabitants of both fairly sophisticated in their medical practices. Concerning malaria, the Pokot appeared to possess special knowledge. On one occasion Dr. Castronovo watched a folk doctor quickly and accurately diagnose a case of this disease.

The physicist collected a long list of Pokot names for their highly specialized folk medicines. He hopes to learn the generic or general terms for these and to determine their active ingredients. Once he has analyzed his findings, he plans to publish a detailed report.

One example of Pokot pharmacology is "cnemokol," a climbing vine said to relieve malaria. After boiling the vine in water, the patient drinks the fluid and chews the plant. Another Pokot medication is "maino," a tree bark used to stem the bleeding of a woman who has just given birth.

Although scanning agents are his major interest, Dr. Castronovo agreed that some of these folk medicines might yield medications useful in treatment. He pointed to a number of drugs which have come from such a source.

Among the best known is digitalis, a heart medication derived from the leaves of the foxglove plant. Once widely used as a folk medicine, digitalis is believed to have been used by the ancient Egyptians as a drug.

Because his survey of medical practices kept him busy, Dr. Castronovo found little time to observe other facets of Pokot life. He did, however, view an unusual ceremony.

He and a fellow expedition member noticed one day that the warriors were missing from their usual resting place under a tree at the edge of the village.

On inquiring, the visitors learned that the men were planning a livestock raid on their neighbors, the Turkana.

The scientists' interpreter led them for several miles on foot through a thick forest to an open area ringed with trees. In the middle, surrounded by a hundred or so warriors, stood the tribe's diviner. One by one, the warriors filed past him, and he annointed them for battle. He splashed the chest of each first with goat intestines, and then with a white, chalky material. Each holding his two spears, the warriors began to chant and jog in place.

"We were invited to join," Dr. Castronovo said, "but were a bit reluctant to do so."

The warriors then heard lectures on warfare from the village elders, who told them how fiercely they should behave. After several minutes of this, the men jogged off in single file to a practice session. The visitors were not permitted to watch. When the warriors returned later, they were mimicking the sounds of the animals they hoped to seize from the Turkana. Thereafter a steer was sacrificed, and all took part in the feast.

The scientists had to leave the area shortly afterward and were unable to learn the outcome of the raid.

For warriors – and even for visiting scientists – life in Kenya is not all work. While driving one day, a group including Dr. Castronovo picked up three Pokot hitchhikers. After clambering into the back of the Land Rover, spears and all, the three said that they knew where the best honey beer in the area might be found.

The hitchhikers guided the scientists to a spot where they had to get out and walk. After traversing what seemed like miles of stubble-filled fields, the group arrived at a shack where several elderly men busied themselves producing the much-praised beverage.

"It proved quite tasty," Dr. Castronovo said, "and well worth the long walk."

The charms displayed here are employed by the Pokot tribespeople for a variety of medical purposes.

When the Patient Asks "Why?"

Two highly distraught men came into the Emergency Ward with their father. He was dead on arrival. The chaplain was called.

An unorthodox seminarian, he did not believe in prayer. As he began talking with the men, they knelt and prayed fervently,

"Now I lay me down to sleep. . . ."

They had not prayed since childhood. But this, the only prayer they could remember, gave them the strength needed in great stress.

"Maybe my theology isn't as rational as I thought it was," the young chaplain later told Allan Reed, Director of Pastoral Services at the MGH.

With months of academic training behind him, this seminarian had just met his first human beings in real crisis. More than 1,000 students had come to the MGH before him for Clinical Pastoral Education. Like them, he would emerge with a deepened theology, greater self-knowledge, and ministerial skills that years of classroom training could not provide.

Now in its forty-fifth year, the MGH program was one of the earliest in the country. It was a well-known MGH physician, Dr. Richard Cabot, who first urged theology students to come to the hospital to learn from and help people in trouble. He realized that healing involves more than the patient's body.

The basic clinical training fills an intensive 11-week course. Following the guidelines of the national Association of Clinical Pastoral Education, Inc., the MGH program also offers a one-year chaplain residency and supervisory training.

While two-thirds of the students are male and female seminarians, anyone can apply who has the backing of his church (which may also share tuition) and who views his work as a ministry. Some have been lay persons, including a psychiatrist, nurses, and social workers. Priests, nuns, ministers, and rabbis come to strengthen their skills or explore new directions.

An ecumenical spirit grows rapidly from a shared mission – and shared anxieties.

"From day one you are a chaplain, and that can be frightening," said Patricia Hundley, formerly a student at the Episcopal Divinity School and now an ordained Lutheran minister.

Careful supervision turns this potentially shattering experience into one of great excitement and growth. It is this care, Miss Hundley believes, that has made the MGH a popular center.

The program is supervised by Chaplains Reed and Donald Amussen (who were both supported by religious organizations until this fall, when Chaplain Reed became the Director of the new MGH Department of Pastoral Services).

"The supervisors bring to the program a great sensitivity to people, a special honesty, and years of ministry," Miss Hundley said. They also employ time-tested techniques.

Each chaplain is immediately assigned to a unit and calls briefly on every patient. After a follow-up visit, he writes a "verbatim," recalling as precisely as possible his conversation with the patient. This is reviewed with a supervisor.

Each morning the supervisors conduct classes in the behavioral sciences, stressing the special situation of a person who is hospitalized. The students' daily experiences shape the major topics: death, grief, and always, "What are the religious implications of this?"

In the afternoon sensitivity sessions the students explore the dynamics of interrelationships. Through role-playing, they learn how chaplains and patients alike disguise their real emotions.

"The first thing we realized is that the always agreeable, always nodding and smiling chaplain drives people nuts," Miss Hundley said. "It is one way of covering up one's own anxieties."

The real source of learning is invariably the patient.

"On becoming institutionalized, the patient experiences some kind of loss – of his dignity, his view of himself, and often, of a loved one in the recent past," Chaplain Reed said.

"Because he is in a crisis situation, he is asking questions of meaning and value – religious questions."

What does the patient expect of the chaplain? Does he view him as a representative of God?

Yes, say the chaplains, and herein lie many complications.

"Patients – and staff – read into our claim to the ministry a broadness of concern and an unfailing personal interest," Chaplain Reed said. "But an untrained person has a lot of trouble dealing with these expectations."

A patient's concept of God may determine whether he wants His representative at the bedside. The churchgoer welcomes this reassurance of God's presence.

But if the patient's God is a punishing one, he may shrink away from the "judgment" of the chaplain.

"The patient may think he 'deserves' the illness," Miss Hundley said. "Or, if he is angry at God for doing this to him, he may be hostile toward the chaplain."

In an institution structured to produce specific results, the chaplain often feels inadequate. His goals are intangible, while the other personnel have clearly defined tasks. But there are also great advantages to this unique position.

"Physicians and nurses are involved quite productively in the curing process. They are concerned with ques-

Chaplain Harry Koenig comforts 8-year-old Joanne Flewell.

tions of fact," Chaplain Reed said. "But the chaplain doesn't have to cure anyone. He is most free to pursue, and most interested in, questions of meaning."

The role of the chaplain, he believes, is to help release the tremendous capacity for growth and healing that lies in each person. He can do this best not by lecturing, but by building a trusting relationship.

And if the patient is dying? The chaplain can be a key factor in helping him resolve questions about his life.

This process is revealed in the story of Mr. Keller (not his real name) and Chaplain Thomas Fuller.

In his verbatim, the novice chaplain recalls his initial fear of entering a dying man's room, his grateful escape

In a role-playing session Priscilla Dreyman, a new chaplain, learns how to approach a "patient," Chaplain Jamie Jones. Looking on are, from left, Chaplains Allan Reed and Donald Amussen, supervisors, and Chaplain Harry Koenig.

into irrelevant topics, his guilt later in thinking he had failed the patient.

On the second visit Mr. Keller was in an intensive-care unit, his speaking prevented by a respirator tube.

He had once told the chaplain he had never prayed, but now he nodded a vigorous assent to a prayer and the reading of psalms. Meanwhile, his wife entered the room.

Remembering the advice of his supervisor, Chaplain Fuller encouraged her to tell the story of Mr. Keller's childhood and their life together. The patient participated in the narrative with smiles, nods, and tears.

Later he wrote on a pad, "Do you remember Job and the boils?" It had become evident that as a child he had been well steeped in Bible stories. The chaplain related the story of Job's afflictions, his anger toward God, and God's answers. Chaplain Fuller commented on the closeness of God.

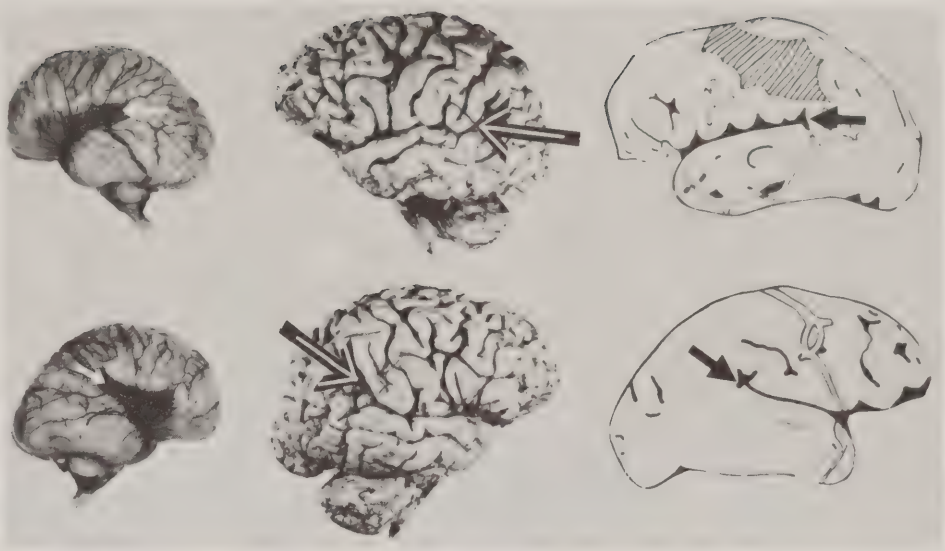
Nodding, the patient "half sat up and patted my shoulder with his right hand. Then he patted his wife's hand. . . . It was as if *he* were in charge of the sickroom and was comforting us. Then he mouthed the words, 'I feel better,' and lay back on the pillow."

Mr. Keller, the chaplain concluded, seemed "more alive than either his wife or I."

He died shortly after the chaplain's visit. He came to terms with a long-rejected God and confirmed, with a loved one, the value of his life.

The intense atmosphere of the hospital helps forge counseling tools that can be used in any situation.

"Clinical Pastoral Education begins with the student's first letter of application," Chaplain Reed said, "and never ends."



From left: infant, modern adult, and Neanderthal brains. Note that in all three one end of the sylvian fissure, indicated by arrows, is lower on the left (top row) than on the right.
(Reprinted with permission of Wistar Institute Press, Vol. 42, January 1975 American Journal of Physical Anthropology.)

NEANDERTHAL

(Concluded from Page 1)

anthropologists, hers represents significant new evidence that the two may be wrong.

Anatomists, for instance, have quarreled with the pair's method in constructing a model of the Neanderthal vocal tract. Linguists have pointed out that the importance of the speech sounds in question remains to be proved. Some anthropologists argue that Neanderthal culture strongly resembles that of other manlike creatures who lived at the same time. Therefore, Neanderthals exhibited no deficiency resulting from their less complex language.

But Drs. Lieberman and Crelin have been able to answer each of these criticisms, apparently to the satisfaction of their supporters.

It was virtually by accident that Dr. LeMay stumbled on the evidence which appeared in her paper in the *American Journal of Physical Anthropology*.

In 1972 she and a colleague showed that in most people a certain fissure (sylvian) appeared lower on the left side of the brain than on the right. The physicians noted this lack of balance in arteriograms, a type of X ray. By coincidence they also detected a similar imbalance in a cast made from a Neanderthal skull.

Since a major speech center of the brain lies along the banks of the left sylvian fissure, these findings suggested equal development in both Neanderthal and modern man.

Dr. LeMay also noted on X rays that the base of the skull and the jaw of some modern humans resemble that of a Neanderthal. In her paper, Dr. LeMay presented the cases of ten modern adults and three achondroplastic dwarves whose throat measurements were similar to those of Neanderthal. All 13 could nevertheless speak articulately.

While discussing the arguments of Drs. Lieberman and Crelin with an anthropologist friend, Dr. LeMay mentioned her own findings. Her friend urged her to publish.

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Village Elder Hands the Scientist a Spear

Soon after an MGH physicist arrived at a village in northern Kenya, the principal elder handed him a spear.

That very evening, the elder explained, a neighboring tribe was expected to raid for livestock. The physicist, Frank P. Castronovo, Jr., Ph.D., would have to take his turn at guard duty.

Although the raid never materialized, Dr. Castronovo experienced one of the more anxious evenings of his life.

A registered pharmacist and specialist in radiopharmacology, he had journeyed to the Marsabit region of Kenya to study tribal medicine and pharmacy among the Borana tribespeople.

He hoped to gain information on traditional tribal medicines the active ingredients of which might serve as radiological scanning agents. Such agents, radioactively "labeled" and injected into the patient's body, form part of a special type of highly sensitive diagnostic examination (May 1974, *MGH News*).

It was in 1973 that the vacationing Dr. Castronovo accompanied an expedition sponsored by Educational Expeditions International. The trip's main purpose was anthropological – to study the effects of a total eclipse of the sun on the astronomically oriented Borana.

Flying to the Ethiopian capital, Addis Ababa, the group reached northern Kenya by Land Rover. Along the route, they encountered a Somali tribesman accompanied by several camels. Covering his face was a white, pastelike substance.

One expedition member questioned him on the meaning of the disguise. The man had apparently killed an enemy tribesman and stolen his livestock. By obscuring his face, he hoped to avoid recognition by his victim's vengeful spirit.

After several days' journey including a long trek on foot, Dr. Castronovo and a small splinter party reached their objective: the village of Iyya Duba. It was here that the physicist spent part of a night nervously standing guard for the raid that never came.

The Marsabit region where Iyya Duba is located is a large oasis at the center of a desert. During Dr. Castronovo's stay, drought and starvation were ravaging the region.

The Borana inhabitants of Iyya Duba are related to the Egyptians and the desert Tuaregs. Like their Arab neighbors to the north, the nomadic, pagan Borana wear simple white robes and sport turbanlike headpieces. Living in grass huts, they depend on goats, camels, and cattle for their livelihood, even using their animals' blood as food.

In studying the medical and pharmaceutical practices of these people, Dr. Castronovo agreed to meet a traveling folk doctor, or Cherisa. Reporting his finding in the *Journal of the American Pharmaceutical Association,* Dr. Castronovo wrote:

"Prior to interviewing the Cherisa, I accompanied him on 'Iyya Duba Grand Rounds' where we visited several Borana patients. One individual was wearing a forearm 'cast' consisting of cloth, sticks, and twine. The

(Continued on Page 4)

At a screening clinic established in Iyya Duba by visiting scientists, a youngster receives treatment for a cut foot.

MGH News

Vol. 34 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1975

Grappling With the Shape of the Hospital's Future

Studying an "Unparalleled Degree of Stress"

Can studying how people cope with varying forms of stress offer psychiatrists clues to help individuals deal with the growing pressures of life in the 1970s?

Two MGH psychiatrists who believe so have looked at three very different forms of stress: the concentration camps of Nazi Germany, life in the polar regions, and life in the ghetto. Drs. Joel E. Dimsdale and Chester M. Pierce described their findings at a scientific meeting of the MGH Department of Psychiatry. Dr. Dimsdale is an MGH psychiatric resident. Dr. Pierce is a Harvard University Professor and also serves on the MGH staff.

Dr. Dimsdale reported on a recently completed study of how people survived one of the most catastrophically stressful environments in history: the concentration camp. While associated with the Stanford University School of Medicine in Palo Alto, Calif., he interviewed 19 survivors living in the Jerusalem and the San Francisco areas.

"People have been looking at extreme stress situations in all sorts of environments," he said, "from man-made disasters to natural catastrophes and from life-threatening situations to those which are a pervasive part of everyday living.

"But what struck me about what happened in the concentration camps of Nazi Germany was the sheer magnitude, the unparalleled degree of stress, and the number of people who went through it."

At the conference Dr. Dimsdale detailed some of the methods the Nazis employed to heighten the stress which their captives struggled under.

In a highly systematized way the Nazis attempted at various times to maximize the prisoners' feelings of helplessness. During the train journeys to the camps, guards received orders to shoot the prisoners at random. Confused by this tactic, the captives were unable to determine whether a particular behavior would insure survival.

The S.S. (a Nazi quasi-military organization) arranged the camps so as to immobilize prisoners by preserving any illusions of security to which they might cling. Over the entrance gates hung the words, "Work makes free." These signs were intended to convince the prisoners that the camps were simply work farms.

At the camps, railroad depots fes-

(Continued on Page 2)

Do men isolated in the Antarctic encounter stresses identical to those of everyday life?

American hospitals are being challenged by a crisis in contradiction: On one hand, expensive medical advances are being cranked out ever more rapidly. On the other, the budget needed to implement them has scarcely kept up with inflation.

Should an institution undertake kidney dialysis? Add a new test for diabetes? Buy the latest brain scanner? Add heart specialists to its staff? And will existing programs have to be cut to make way for the new?

To grapple with the challenge Dr. Charles A. Sanders, General Director, has established a "Resource Allocations Board." Its purpose is to examine each request for a major new service and balance the proposal with the existing patient care and funds available.

Believed to be the first such committee in the country, the board faces the awesome task of recommending the adoption or denial of programs and procedures that will shape the future of the hospital. At the same time the board is expected to save the patients' money by avoiding or eliminating marginal services.

What follows is a description of the early months of decision-making by this novel committee. [Editor's Note.]

The issue confronting the new Resource Allocations Board seemed clear: The Department of Medicine wanted to triple from two to six the number of residents training in primary care. Everyone – the public, the department, and the hospital administration – agreed on this need for providing the nation with more generalists in an outpatient setting as contrasted to specialists. There was only one stumbling

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EDITORIAL:

On the Limits of the Financial Pie

In the musical "Oklahoma," one of the characters sings, "Everything's up to date in Kansas City. They've gone about as fer as they can go." Of course Kansas City didn't stop growing. The lyrics, however, can be applied to one aspect of the MGH. When Dr. Charles A. Sanders became General Director nearly three years ago, he announced that the bed capacity had reached optimal size. Adding significantly to the 1,084 beds might well prove counterproductive to patient care as well as to efficiency of operation. Despite the construction of a new building, three years later the capacity remains at 1,084.

There is one other way in which the hospital may be plateauing. Given the 1975 economy, the MGH is unlikely to have increasing financial resources in terms of real dollars. Does that mean the hospital will be unable to continue to show leadership in patient care, teaching, and research? No more than Kansas City has stopped growing since the days of seven-story skyscrapers. But when the financial pie reaches its maximum size, only the quality of the ingredients can change. In a hospital's case the quality of patient care can still improve. To achieve this in the face of a finite financial pie means scrutinizing more than ever the ingredients that go into care.

One direction to take would be that followed by Congress when it decided to make kidney dialysis available to everyone receiving Medicare. An admirable goal. The only trouble was that few people paid careful attention to how much such coverage would cost. Instead of several millions of dollars estimated by most legislators, the eventual implementation of the law may well cost $1 billion annually. As important as dialysis is for those who would otherwise die of kidney disease, the expenditure raises another question. Might many more lives be saved if the same sum went to other programs?

In establishing a Resource Allocations Board (page 1 article), Dr. Sanders wants to be able to grapple with such questions as they pertain directly to the MGH. However, he wishes to answer them before the hospital invests large sums in a new treatment or the extension of an old one. America is finally learning that its resources are not unlimited. The corollary is that they must be husbanded. The same recognition is beginning to dawn on all segments of the economy. Although hospitals like the MGH do not and cannot make a profit, they too must come to grips with the finiteness of the pie. To do less would be immoral. The Resource Allocations Board may not solve the gigantic and growing problems demanding a selective decision-making process. But the board is at least a start.

From Stress Studies, Psychiatrists Learn How to Help Patients

(Continued from Page 1)

tooned with travel posters gave credence to the hopes of Jewish prisoners that they had arrived at just another railroad station. By disguising the gas chambers as showers complete with attendants and numbered coat hooks, the S.S. overseers hoped to preserve such delusions to the very end.

Faced with starvation, humiliation, atrocities, and the constant shadow of death, many became filled with hopelessness and apathy. If anyone began to display such emotions consistently, the S.S. would quickly weed him out for execution.

In his study, however, Dr. Dimsdale showed that those who survived did so with skill and dignity. These people lived through the experience by adopting strategies of coping.

Through his interviews with survivors, the MGH resident identified 10 such methods (see page 6 story). Two are commonly found in a number of coping and stress studies: group affiliation, or looking to others for support, and what Dr. Dimsdale called "blind, naked hope."

Despite their courage, few survivors emerged without deep emotional scars. The former prisoners exhibit what various researchers have identified as "the concentration camp survivor syndrome." Persisting through decades, this condition carries with it low self-esteem, anxiety, depression, guilt, nightmares, a number of psychosomatic disorders, a deep distrust of other human beings, and identification with the dead. Typically, survivors told Dr. Dimsdale, "*We* died . . ."

Stamped indelibly on the victims' memories, the concentration camp experience remains as vivid as yesterday. While Dr. Dimsdale was interviewing one survivor in Jerusalem, an accident nearby produced a loud crash. Turning pale, the woman looked about her in a daze. "For a minute," she explained, "I thought I was back in Bergen-Belsen [site of a concentration

Photographs: Pages 1, 3 (bottom), U.S. Navy; pp. 4, 5, 7, Joel Salhanick; p. 6, Wide World Photos Inc.; p. 8, the late Francis W. Hatch.

As their Warsaw ghetto burns behind them, Polish Jews are herded away to concentration camps.

camp in Germany]. I thought it was the guns going off."

The study of what happened in the Nazi concentration camps, Dr. Dimsdale said, may yield a wealth of information about stress and how people cope with it. In addition to helping psychiatrists deal with the emotional wounds left by the camps, such knowledge may aid the doctors in treating those who have suffered other types of stress.

Of late, the MGH resident said, a frightening echo of the survivor syndrome has begun to appear. Although scanty, the evidence of other studies suggests that the survivors' children are developing psychiatric difficulties similar to those of their parents.

At the conference, Dr. Dimsdale's fellow speaker, Dr. Pierce, focused on stress in the Antarctic and the ghetto.

Dr. Pierce has participated in a number of studies of life at U.S. Naval stations near the South Pole. In this isolated, extreme environment, he and his co-workers examined some unusual behavior.

Very prominent were "drifting" and "staring." After several months of being trapped by winter at the Pole, some men would experience brief periods of simply sitting and staring vacantly into space.

Drifting is a more continuous behavior, characterized by apathy and general loss of mental agility. For several months after leaving the Pole, many men are relatively apathetic.

From his own Antarctic studies and the work of others on men living in space, Dr. Pierce has extrapolated a few traits which he believes to be common to every situation of extreme stress. He supplemented these with several more compiled by a team of systems analysts. The complete list: dependency, forced socialization, spatial isolation, time elasticity (long stretches of free time), noise extremes, boredom, anxiety, sociological and biological dysrhythm, fears of abandonment, loneliness, panic, and hopelessness.

He theorizes that these traits must also characterize the "mundane," everyday extreme environment, such as the urban ghetto in this country:

"To my way of thinking, mundane stress is much more awesome than exotic stress such as that encountered in the polar desert. Mundane stress is subtle, cumulative, and incessant. People expect it automatically and accept it as unremarkable."

While status and material compensation may accrue to men who venture into space or the polar regions, life in the ghetto earns no rewards. In space, under the sea, or at the South Pole, men know that should anything go wrong, massive forces are poised to attempt their rescue. The ghetto dweller, however, can nurture no such hope.

Dr. Pierce, who at Harvard is both a Professor of Education at the Graduate School of Education and Professor of Psychiatry at the Medical School, intends that his theory will lead to further investigations of stress in the ghetto. Factors such as sleep patterns, noise levels, and population density and

(Concluded on Page 6)

While massive forces are poised to rescue men stationed at the South Pole, the inhabitant of the mundane stressful environment knows that his cries for help will go unheeded.

TWO BASIC CONCERNS:

Do Patients Need It? Can MGH Afford It?

(Continued from Page 1)

block. In examining the cost of the proposed expansion, the board members judged it too expensive.

Would the Department of Medicine give up two regular residency positions in return for four added primary-care posts? It would, and it is doing so.

The issue of training more primary-care physicians exemplifies one type of problem the Resource Allocations Board considers. Under the new group's scrutiny come all requests for personnel, services, renovations, and equipment which involve significant new spending. The group is also evaluating the need for existing services which may have marginal patient-care value.

In announcing the formation of the board, Dr. Sanders had written:

"Historically, most changes at the hospital have evolved on an *ad hoc* basis. Services have been instituted and equipment purchased on the basis of needs articulated at the time rather than in the context of a long-range plan.

"In fact, sustained master planning at the institution has not been carried out, and many decisions have been made in response to crises."

In determining the need for the board one concern was the government restrictions on the rate at which the Medicaid system reimburses hospitals. In times already financially difficult, these restraints are creating an added burden for institutions across the nation. At the MGH Medicaid pays no more than $220 per patient per day to cover all services. But the average Medicaid patient costs the hospital $245 a day.

In deciding to create the new board, Dr. Sanders also considered the lack of space in which to provide added services. Another factor was optimal size:

"A hospital with 1,084 beds," Dr. Sanders said in a recent interview, "has about as many inpatients as it should care for. Above and beyond this point you would run into problems of communication. You would no longer realize the economies of scale available to a large hospital, and the spirit of the institution would begin to deteriorate.

"I think that any time we add something to the hospital we've got to look closely at what it does to the vitality of the institution and therefore to patient care, as well as how much it costs. It was with all these things in mind that I instituted the Resource Allocations Board."

Designed for balance, the board comprises four MGH administrators and five physicians. The doctors represent expertise in surgery, medicine, anesthesiology, and radiology.

To maintain a constant reservoir of experienced hands, the members are serving staggered terms of two or three years each. The hospital's chief financial officer, Associate General Director Lawrence E. Martin, was appointed to an indefinite term as the group's Chairman.

Miss Isabella Tighe, MGH Patient Care Representative and a member of the board, believes that its diverse membership has helped it immeasurably in carrying out its duties.

"I think that one of the things that makes the board effective," she said, "is the multidisciplinary representation of the members, which gives us all a clearer understanding of the everyday workings of the hospital."

Meeting every other week, the four administrators and five physicians examine each spending request according to a carefully prescribed procedure. Every person making a request must write an application. Striving for fairness, the board also submits questions which applicants must answer in person. Thus, the physician or administrator who may not present his case as effectively in writing suffers no penalty.

On each proposal the board shines two lights.

"First," said Mr. Martin, "it asks whether or not a project is necessary for patient care. And secondly, can the request be financed under the present mechanisms for reimbursement by third-party payers? If the answer is 'yes' on both questions, then a recommendation is forwarded to Dr. Sanders that this particular request be approved.

"Even if one or both of the answers are 'no,' Dr. Sanders may still, on the basis of additional information, approve a project. Likewise, he may turn down one which the board had recommended be carried out. To date Dr. Sanders has carried out all the recommendations."

The Resource Allocations Board has

MGH Associate General Director Lawrence E. Martin pores over a spending request submitted to the Resource Allocations Board. He is the board's Chairman.

The Resource Allocations Board meets. From left: Dr. Myron B. Laver; Miss Isabella Tighe, Patient Care Representative; Lawrence E. Martin, Associate General Director; DeLanson Y. Hopkins, Director of Medical Support Services; Dr. Ronald A. Malt; and Dr. Stanley Baum. Missing from the photograph are Miss Mary E. Macdonald, RN, Director of the Department of Nursing; Dr. Edwin P. Maynard III; and Dr. Morton N. Swartz.

so far reviewed seven major proposals for additional spending by the MGH. Three have been approved, three rejected, and one postponed because it cost too much.

Determining whether or not the hospital can pay for a new service or facility is usually relatively simple. Though occasionally more complicated, it often hinges on whether or not Medicaid or other health-insurance plans will cover the added cost. Otherwise charges either would be raised or the hospital would assume a debt.

This consideration has greatly affected hospital planning. Since Medicaid restrictions favor ambulatory care, for instance, the MGH has tended to allocate more resources to developing outpatient services and facilities. Encouraging care in this setting saves the patient from high-cost hospital beds.

But how does one determine the importance of a proposed project to patient care? In this area, Mr. Martin said, the expertise of the physician members comes heavily into play.

"There are several ways to look at necessity," said Dr. Ronald A. Malt, who represents surgery. "An example might illustrate one of them. Let's say a test were proposed that would add quantitative data, say certain measurements, to the patient's chart and that would seem to be of potential benefit. As a physician you ask yourself, 'Suppose I knew that this test showed an abnormal result, would that be significant enough to in any way modify the care I would give so as to make it more effective, efficient, or comfortable for the patient?'

"If not, then no matter how elegant the test or how sophisticated the information obtained, you must conclude that the test would not contribute to the welfare of the patient and is therefore economically superfluous.

"Ultimately, the Resource Allocations Board will lower relative costs not only for the MGH but for the patient and general public as well. By helping to eliminate or avert marginal services, the board will cut fat from the patient's bill and thus aid in putting a brake on the premiums charged by health insurers."

Among the board's most difficult decisions are those involving services which now have little direct application to patient care but may do so in the future. How significant will their benefits turn out to be? How much of a financial burden should the MGH assume when those benefits will accrue equally to patients at other institutions?

Whatever the individual decisions, the Resource Allocations Board is committed to preserving what Dr. Malt called the MGH leadership role in "tomorrow's medicine."

"We believe," he said, "that we must innovate for tomorrow and look into things that eventually may make recovery from disease better for other people at other times."

As it has found its footing, the board has expanded its role slightly beyond its original charge. It has, for example, ventured into looking at existing services with an eye not only to cutting but also to adding new ones which might be needed.

The board does not, however, set policy.

"Its purpose is advisory," Dr. Sanders said. "It is not an official planning body. Unless requested to do so, it does not spontaneously develop programs or goals. There are of course exceptions – instances where an allocation of resources in essence requires development of a goal."

One such example was the consideration that went into the request for additional residents in primary care. Before reaching its conclusion, the body had to decide whether outpatient or inpatient care and training should receive increased emphasis in the hospital's spending. By substituting primary-care physicians for internal medicine, the decision leaned toward outpatient services. In reaching this conclusion the board considered community needs, a factor weighed in all its deliberations.

Both Dr. Sanders and the members feel that the Resource Allocations Board concept has wide application. Dr. Sanders suggested that any hospital with more than 100 beds or a budget exceeding $10 million might especially benefit from such a committee.

Mr. Martin believes that the board has proved particularly useful in confronting tightening government restrictions on Medicaid and other reimbursement schemes. Under national health insurance, which appears imminent, he believes that some type of resource allocations body will become virtually indispensable at all hospitals.

"When national health insurance comes in," he said, "I think we're going to be paid on a restricted formula basis. We're going to have to live within the budgetary limits which the Federal Government sets.

"Many hospitals like the MGH will have to make some very hard decisions about what services to offer and what cannot be afforded. When that time comes, any hospital that has adopted a resource allocations board will be fortunate indeed to possess a seasoned group of individuals who know how to attack these problems."

Some Ways in Which Survivors Softened The Impact of Stress

Faced with extreme stress, how do people soften its impact on themselves?

In his study of Nazi concentration camp survivors, Dr. Joel E. Dimsdale identified ten ways in which prisoners accomplished this by altering their attitudes, behavior, or both. The MGH resident described these methods in detail in a scientific paper published in July 1974 in the *American Journal of Psychiatry*.

Some persons focused only on the good aspects of their experiences.

"In the camps I saw many prisoners beaten to death when they could work no more," said one survivor describing a particular stage of her imprisonment. "However, that was a good period for me; we had no work on Saturday and were in camps where we could walk in the fields and sometimes had the luck to catch a potato or carrot."

Among the more powerful coping strategies, or methods of dealing with stress, was an emphasis on survival for some specific purpose. Some prisoners vowed to survive so that they could bear witness to atrocities. One woman who typified many others told Dr. Dimsdale that she had lived to be with her family again.

"There were times I did not feel like waiting for my food," she said, "but then I remembered my sister needed me, and my husband needed me."

In his study Dr. Dimsdale termed the third major coping strategy "that of 'psychological removal.' It essentially revolves around insulating oneself from outside stress, developing ways of not feeling – so that 'I'm not here,' and 'This is not happening to me.' "

Mastery of the environment through attitudes or action also kept the camp experience from becoming unbearable. One woman began for the first time to follow the religious tenet of fasting on the Jewish holiday of Yom Kippur.

"I did not believe in God at that point," she said. "I just wanted to show the Germans that I could be Jewish if I wanted to, even in Auschwitz [a concentration camp]."

The simple will to live was one of the staples of survival in the camps. Faced with the suffering that accompanied longer life in this setting, not a few prisoners lost this basic drive.

Hope and group affiliation, coping strategies commonly used the world over, were also at work among the camp inmates. The groups included political parties, the camp underground, fellow countrymen (the imprisoned came from all over Europe), and families.

Some prisoners resorted to childlike, dependent, and regressive behavior. Particularly when displayed by younger persons, for example, constant crying would elicit help from fellow inmates and sometimes even guards.

Among the ten coping strategies Dr. Dimsdale included two which do not truly lessen stress but help remove some of the internal strain which it can produce. These two are known as "null coping" and "anticoping."

Null coping involves passively accepting whatever happens. By thus adopting a fatalistic attitude, the individual can avoid blaming himself for not having somehow prevented the stress.

When anticoping, prisoners generally decided that their captors were in the right. The Nazis referred to their prisoners as "vermin." By accepting this judgment, a person could avoid some of the painful feelings associated with the injustice of his fate.

Through his interviews with survivors Dr. Dimsdale learned that they had often combined these different types of coping in complex and shifting patterns.

Dr. Dimsdale hopes that his work will contribute to general knowledge about coping. It is further hoped that psychiatrists can apply that knowledge to help people cope more effectively with the multiplicity of stresses they face.

An emaciated concentration camp inmate delouses what remains of his clothing. "The simple will to live was one of the staples of survival in the camps."

Studying Stress

(Concluded from Page 3)

its effects represent good targets for early study.

As a result of such research, Dr. Pierce hopes that ghetto dwellers will be able to learn how better to negotiate their environment. Then, by overcoming feelings of helplessness about their situation, they will be able to improve their lives. On prospects for a white-dominated society doing this on its own, Dr. Pierce is pessimistic.

Such efforts to help people deal with stress, Dr. Dimsdale said, belong to one of the main enterprises of psychiatry.

"A lot of our working therapy involves exploring the habits people have fallen into – ways of thinking, feeling, and approaching stress – that aren't working so well.

"We are constantly absorbed with the questions of how people cope with stress: What are the stresses? And what can we learn about how people get through stress?"

Scientific Knowledge Aided Childhood Prank

(Concluded from Page 8)

retiring. His own prominence as a scientist only serves to contrast with his reticence. He carefully shields his private life from public view. While reporting that he is living happily in Cambridge with his wife, Anne, and that he has 12 grandchildren, Dr. Cori politely declined to identify a granddaughter appearing with him in a photograph.

His only revealing comments appear in an autobiographical sketch of his early years. In the 1969 *Annual Review of Biochemistry* he wrote about those times with a twinkle in his eye and candor in his pen.

Born in 1896 in Prague, Austria-Hungary (now Czechoslovakia), he derived his scientific interest from his father. A zoologist, the elder Cori headed a marine biology research station on the Adriatic Sea. The young Cori delighted in accompanying him on motorboat trips to collect specimens.

For the knowledge gained while assisting his father, Cori found some immediate and practical use – in a series of childhood pranks. He once hid silkworms about his home, timing their hatching as moths to coincide with a big party.

"The plan was eminently successful," Dr. Cori recalls, "and mortified my mother, who thought anything flying about the room reflected on her housekeeping. My father, however, quickly identified the moths and their source."

Somehow both the young Cori and his parents managed to survive those youthful escapades. He began his study of medicine at Carl Ferdinand University in Prague as the First World War was beginning. In his third year he was drafted into the army.

Following a series of unpleasant adventures, he came to serve at a hospital for infectious disease. The war was drawing to a close. During the final collapse of the Austro-Hungarian army, the hospital was evacuated. Cori was forced to join the long retreat, once spending several days riding on the roof of a boxcar.

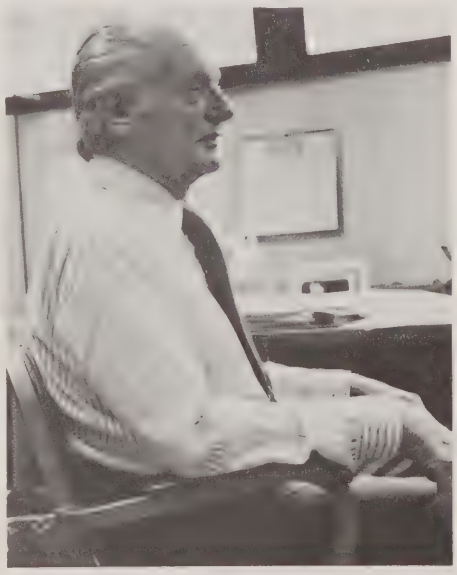
Peace allowed him to continue his medical education. Conditions, however, remained chaotic. In the summer of 1920 he worked at a Hungarian university in a laboratory headed by a researcher named Dr. Geza Mansfeld. Since the institution was to be

Dr. Carl F. Cori: "The question of what makes a great scientist is not easily answered. There is no specific quality you can mention."

taken over in the fall by the new nation of Czechoslovakia, Dr. Mansfeld stood to lose his laboratory. Over several nights, Cori and fellow researchers helped him launch a new one by dressing as laborers and spiriting the equipment out. It was then smuggled over the Danube into Hungary.

After receiving his M.D., Dr. Cori went to work in Vienna. He recalls an atmosphere which hinted at things to come. To secure employment, he was forced to prove "Aryan" ancestry. Economic difficulties abounded. "As the Viennese would say in their humorous way," Dr. Cori writes, "the situation was hopeless but not serious."

When in 1921 he was offered a post



"If you find something unexpected, you must have that quality which tells you that what you have stumbled on is important."

in Buffalo at the New York State Institute for Malignant Disease, Dr. Cori eagerly accepted. Dr. Gerty Cori, his wife of one year, later joined him in this country.

Women's liberation had not yet emerged and at first the Coris encountered fierce opposition to their attempts to work together. Dr. Gerty Cori was informed that it was "un-American" for a man to collaborate with his wife. At times the two scientists resorted to working together in secret.

They moved to St. Louis in 1931. Work begun there in the Washington University School of Medicine's Department of Pharmacology led to the Nobel Prize in 1947. When Dr. Carl Cori left St. Louis to come to the MGH in 1966, he retired as Chief of the school's Department of Biological Chemistry.

The winner of numerous awards and holder of ten honorary doctorates, Dr. Cori is researching as actively as ever. Since his official retirement, he has published 25 papers in scientific journals. Of his two most recent papers, one reports the purification of an enzyme involved in the body's basic system for handling sugar. The other publication describes the results of an investigation of genetic mechanisms in mice.

The MGH scientist considers genetics the most exciting biomedical field of inquiry today. Were he beginning his career now, he would concentrate on this area. Why? Because these mechanisms affect all organisms, and while recent discoveries have opened up the field, many questions remain unanswered.

For the future, Dr. Cori believes that wherever science probes, it will continue to find answers. It is only a matter of time, persistence, resources, and capable scientists.

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A Nobel Laureate Who Fits No Formula

When a member of his laboratory decided to pursue a research lead, Dr. Carl F. Cori thought that the new work was doomed to failure. The idea on which it was based simply would not work.

Five years later, however, the scientist, Dr. Earl W. Sutherland, isolated a substance called cyclic AMP. With its many regulatory functions in the human body, cyclic AMP is regarded as one of the finds of the century. For his contribution Dr. Sutherland won the Nobel Prize for Medicine or Physiology in 1971.

For Dr. Cori the incident demonstrates one of the ingredients of scientific greatness. Dr. Sutherland was too stubborn to believe that his idea, seemingly unfeasible, would fail. And Dr. Cori believes tenacity is one of the characteristics essential to scientific achievement.

Before he came to the MGH nine years ago to direct the Enzyme Research Laboratory, he himself had won a Nobel Prize. And Dr. Sutherland was only one of a parade of Nobel laureates who, over the years, had passed through Dr. Cori's laboratory at Washington University of St. Louis.

Dr. Arthur Kornberg synthesized DNA, the universal genetic code material. Dr. Severo Ochoa performed the same task for RNA, the substance which translates DNA's messages to the cell. In Dr. Cori's laboratory, both men served a year as postdoctoral fellows. They shared a 1959 Nobel Prize.

Among other postdoctoral workers furthering their education in the laboratory were Drs. Luis A. Leloir and Christian R. deDuve. In 1970, Dr. Leloir won the Nobel Prize for Chemistry after discovering a substance which plays an important role in the body's production of sugar and various related compounds. The 1974 Prize for Medicine or Physiology went to three men, Dr. deDuve among them. He had discovered within the cell a number of special particles known as organelles.

Dr. Cori's own Nobel Prize, which he shared with his first wife, the late Dr. Gerty T. Cori, was awarded for their discoveries of how the body converts glycogen, a kind of starch, into blood sugar. This is one of the body's most important basic mechanisms.

In a leisure moment Dr. Carl F. Cori and granddaughter examine a creature constructed from a zucchini squash.

It would seem that a man who has seen so much excellence in science could shed some light on what goes into a great scientist. But Dr. Cori is reluctant to suggest a formula.

"The question of what makes a great scientist is not easily answered," he said in his soft Austrian accent. "There is no specific quality you can mention."

He agrees, however, that a mixture of intuition, luck, and divergent thinking can often help produce scientific discoveries.

"Imagination and intuition are certainly factors," he said. "Sometimes scientists are not willing to believe current ideas. Even though their own evidence may be vague or unacceptable to begin with, they still have a feeling that there is something there that they have to keep searching for."

If serendipity is to lead to discovery, however, the investigator must possess a special faculty:

"If you find something unexpected, you must have that quality which tells you that what you have stumbled on is important."

Scientific endeavor, Dr. Cori said, involves numerous choices – decisions about when and how to pursue a line of inquiry and when to drop it. While imagination and luck may help the scientist make the choices, the rest is careful, detailed labor.

Dr. Cori would agree with the assessment that "genius is 1 percent inspiration and 99 percent perspiration."

The MGH scientist also believes that technical prowess in the laboratory is almost an essential ingredient for a successful scientist.

"You must rely on your results absolutely," he said, "and of course, you must remember every single thing you do."

What about the scientist as a human being? How true-to-life is the stereotypical researcher with narrow interests and very little existence outside his laboratory?

The noted investigators he has known, Dr. Cori said, fit into no mold. Emerging from all backgrounds, they possess personalities that vary widely. Some resemble the stereotypes. Others belie it.

Dr. Cori himself has enjoyed a lifelong interest in the arts. For archaeology, however, he has fostered a special love. With a smile that radiates kindness, he admitted, "I indulge in it at the expense of reading novels."

Dr. Cori is remarkably modest and

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MGH News

Vol. 34 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September, 1975

A Strange Muscle Disease: 40 Years of Progress

Treating Child Abuse By Aiding the Family

To many, the parent who inflicts serious injuries on his youngster or neglects one of his basic needs such as food or clothing is a hopelessly warped criminal. He should be punished and his child permanently taken from him.

Others, fearing precisely these consequences and concerned for the welfare of both parent and child, fail to report suspected cases of abuse and neglect.

In the opinion of experts, neither view is justified. Wherever possible, child-abuse therapists favor keeping the youngster in the home. And rather than focusing on parent or child alone, they prefer to treat the family as a unit.

"Child abuse is a family disease," said Dr. Andrew D. Guthrie, Jr., an MGH pediatrician who takes a special interest in the problem. "Protecting the child and ignoring the needs of the parents are as ineffectual in the total management of this process as focusing solely on the parents and ignoring the safety and needs of the child."

Separating the abused or neglected youngster leaves him with emotional wounds often as devastating as the mistreatment itself. In addition, removing the child and ignoring the parents may merely shift their focus. Untreated, they might begin abusing another of their children – if they are not already.

Of course, the family-oriented approach depends on the cessation of the abuse or neglect. If any danger to the child persists, the intervening agency

(Continued on Page 6)

Two Ills Disguised as One?

Long regarded as a single entity, the muscle-weakening condition known as myasthenia gravis may in fact represent two deceptively similar diseases.

That is the view of two MGH neurologists who have uncovered new evidence to support the theory. The neurologists, Drs. Barry G. W. Arnason and David P. Richman, have also shown increased likelihood that a type of immunity previously suspected plays a role in myasthenia's basic cause.

Drs. Arnason and Richman anchor the two-disease theory in the pattern of incidence of myasthenia. Although most common in women in their 20s, it reaches a second peak in older men.

Three curious differences exist between these two groups. First, each reacts to myasthenia medication in slightly dissimilar ways. Second, while the young females exhibit general weakness, older men suffer mainly weak

(Continued on Page 4, Column 2)

Testing Mrs. Michelle Marinthe's strength

Until Aristotle Onassis died this spring, few lay people had ever heard of myasthenia gravis. But 40 years ago, in 1935, the MGH founded what is generally believed the first North American clinic devoted exclusively to this disease. Written to commemorate this 40th anniversary, the following article describes progress made in the treatment of myasthenia. [Editor's Note.]

As Mrs. Michelle Marinthe hobbled into the office of an MGH neurologist, despair was catching up with her.

Mrs. Marinthe suffered from a general muscle weakness which had virtually immobilized her. Weakened eye muscles left her with double vision. So feeble were her arms and hands, she could neither grasp a pen nor cut her own food with a knife. Even if she could find something to smile about, she was unable to show it; the muscles of her face were too weak.

For Mrs. Marinthe, an attractive 36-year-old from Rheims, France, this visit to the MGH was the latest stop on a long and disappointing odyssey.

It had begun in 1964 when her symptoms first appeared. She had at once seen a physician, who prescribed medication. But her problems persisted. She tried another doctor, and when he could not help her, she began going from physician to physician – all to no avail.

Visiting a sister in the United States four years ago, she saw a neurologist at another of Boston's medical centers. Like the others, however, he believed Mrs. Marinthe's heightening difficulties were emotional in origin.

"I was very sick and depressed," Mrs. Marinthe recalled. "I was almost

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EDITORIALS:

Child Abuse—A Need for Sympathy

Child abuse is a common problem – common enough to deserve better understanding. However, the underlying public attitude toward child abusers stems from emotion rather than reason. An abused youngster evokes the strongest kind of reaction: "How dreadful. The poor kid. His father [or mother] must be a monster." As a page 1 article relates, the subject is not that simple. The underlying reasons for the beatings inflicted are usually very complex. And the abusers come from all walks of life, all income levels. While no one can condone the striking of any innocent human, the evidence is growing that the parent who abuses deserves as much sympathy and help as condemnation. Increasingly, medicine is recognizing the situation and dealing with it.

Eradicating an existing problem, though, is always more difficult than preventing it. Some experts like Dr. Andrew D. Guthrie, Jr. would like to see a vigorous preventive effort. He believes that the schools could play a major role. By preparing youngsters for parenthood, educators might break through the often relentless cycle in which an abused child becomes an abusing parent. Despite the potential expense, the idea merits careful consideration.

Myasthenia Gravis—A Matter of Time

Precisely 40 years ago a clinic founded solely for treatment of myasthenia gravis opened at the MGH. Believed the first such clinic on this continent, the unit and its inpatient backup facilities have become a Mecca for patients suffering from this neuromuscular affliction. Treating the victims of the disease has made physicians here desirous of being able to do more to help. And so, basic studies of the ailment are carried out here.

Myasthenia gravis is one of those puzzling disorders which afflict mankind. Often its most serious neuromuscular symptoms can be controlled but not eliminated. The condition remains difficult to manage, and its basic cause, unknown. Investigators in several medical centers are probing deeply into the cause of the confusing disease. Their findings are described in a page 1 article. New clues as well as confirmation of older hypotheses are turning up. As a result, there is reasonable hope that the fundamental mystery shrouding myasthenia gravis may yield to medical science over the next few years. With better understanding might well come improved treatment and perhaps a cure. Yet scientific progress is at best unpredictable, and patience is the motto of the successful researcher. If skill and persistence count for aught, only the time frame, and not the result, remains in question.

BOOKS:

What You Should Know About Health Care *Before* You Call a DOCTOR!

by G. Timothy Johnson, M.D.

(McGraw-Hill Book Co. 424 pages. $8.95 hardcover. $3.95 paperback.)

A lengthy title for a long book that reads quickly. But *Doctor* lives up to its full title. Because of his varied roles as a physician, minister, network and local television medical specialist, educator (Harvard Medical School), emergency expert, first at a community hospital (Lynn Union) and now at a teaching hospital (Massachusetts General), Dr. Johnson speaks from a unique vantage point.

Experienced in answering lay questions on television, he anticipates them in print. He writes in clear, conversational style that translates "medicalese" into simple, lay "American." The result is what may be the first book to approach the ideal of guiding the prospective patient through the maze of confusion enveloping the entry point to the highly complex health-care system.

That it requires 400 pages to approach the goal is largely a measure of how intricate health care has become in an age of fissioning knowledge.

Dr. Johnson's explanations make the complicated medical specialties (nephrology, urology, etc.) as easy to digest as custard. He offers guidelines on when to use a specialist and when a generalist.

A superb section on emergencies provides sensible advice without attempting to be the "compleat" first-aid compendium. Wisely, the patient's peace of mind is thoughtfully considered.

Embracing many convictions, Dr. Johnson attacks boldly such controversial issues as oral drugs for diabetics, breast-cancer surgery, unnecessary surgery, plastic surgery, and coronary-artery-bypass surgery.

After offering guideposts for when to see a doctor, how to choose one, and what kind to choose, he takes the reader into the physician's office. He tells him what questions to ask and even suggests how to phrase them. Finally, he lets the reader observe how the doctor's mind works. For good measure he advises how to have an excessive fee adjusted.

(Concluded on Page 3, Column 1)

Photographs: Pages 1, 3, Robert Crivello; p. 5, courtesy New England Aquarium; pp. 6, 8, Joel Salhanick. Page 4 drawing by Paul Andriesse.

Drugs Can Dramatically Reverse Weakness

(Continued from Page 1)

paralyzed and could not even pick up the phone to call for help. I thought of committing suicide because the doctors told me the symptoms were my imagination."

Because of the upset created in her home by the undiagnosed illness, her husband divorced her.

In the spring of 1974 Mrs. Marinthe again visited Boston. An acquaintance, knowing her problem, recommended that she see Dr. Vincent P. Perlo, an MGH neurologist.

On hearing her symptoms Dr. Perlo, an expert on myasthenia gravis, surmised at once that she was suffering from this debilitating disease. He gave her an injection of a drug called Prostigmin. Within 15 minutes her weakness had subsided.

Although no cure for Mrs. Marinthe's condition exists, tablets which she takes regularly have enabled her to return to a normal life. She notices only a slightly impaired ability to lift heavier objects.

Fortunately, physicians quickly catch most cases of myasthenia gravis in their diagnostic nets. The disease, however, does lend itself to the kind of errors which plagued Mrs. Marinthe.

Since it is relatively uncommon, affecting one in 18,000 people, many doctors see only a handful of cases in a lifetime. In addition, numerous illnesses mimic myasthenia. These include several types of muscular dystrophy (degeneration of muscle), multiple sclerosis (progressive disease of the central nervous system), and emotional problems.

Unless the physician has learned to automatically suspect myasthenia on seeing weakness, he may err. In most cases he can confirm or set aside his suspicion by administering a medication which usually has a dramatic effect on myasthenics.

If an injection does not corroborate the diagnosis, an electromyographic test will. This procedure measures how a muscle responds to electrical stimulation.

The severity of myasthenia varies greatly from one patient to the next. In some, it produces only a slight drooping of the eyelids. At the other end of the spectrum, it may hamper the person's breathing, endangering his life.

Most common among young adult women, the disease sometimes sets in suddenly, sometimes gradually. Inexplicably, about 15 percent of myasthenics spontaneously recover from the condition.

Precisely what causes the weakness characteristic of the disease is uncertain. Physicians believe, however, that the problem lies in the neuromuscular junction, where nerve and muscle adjoin. It is through this region that the body sends its signal for a muscle to contract.

When a person decides to perform some physical task, an electrical impulse from the central nervous system speeds down the nerve adjoining the muscle to be used. At the neuromuscular junction this impulse triggers the release of a chemical called acetylcholine. This substance induces an electrical reaction in the muscle, causing it to contract. Medication affecting the levels of acetylcholine in the patient's body provided the first breakthrough in treatment.

Before then, no method of relieving myasthenia's symptoms existed. About 85 percent of those affected eventually died from the disease.

"The first dramatic change in the treatment of myasthenia," said Dr. Perlo, who is Physician-in-Charge of the MGH Myasthenia Gravis Clinic, "occurred in 1934 when an English physician named Dr. Mary Walker demonstrated that you could give a myasthenic an injection of a drug called physostigmine and quickly make his muscles normal for a period of time. This was quite an astounding finding."

Dr. Walker stumbled on the treatment. While studying paralysis caused by curare, a South American Indian arrow poison, she noted that its victims exhibited symptoms resembling those of myasthenia.

She knew that the antidote for curare poisoning was physostigmine, a member of a class of drugs called anticholinesterases. These substances inhibit the action of an enzyme which normally breaks down acetylcholine. Their final effect, therefore, is to increase the body's acetylcholine supply, thus enhancing the ability of the muscles to contract.

The English researcher realized that

(Concluded on Page 4, Column 1)

(Concluded from Page 2)

Many professionals will quarrel with some of his advice to the layman. Example: "Don't hesitate to do a little reading in standard medical sources."

Many will find fault with the politicized, provocative final plea for government funding of medicine on the model of public-school education. Laymen may resent being constantly upbraided for ruining their own health (smoking, ignoring medical symptoms, etc.).

From a literary standpoint the colloquial style of a television narrator, occasionally strained humor, banal bromides, and somewhat unevenness of editing, plus the frequent (generally purposeful) repetitions may at times prove irksome. But the book's refreshing candor overcomes these peccadilloes. More importantly, the information is there; it is well indexed, highly understandable, sometimes eloquent, and very much needed. M.S.B.

Preparing to return to her home in France, Mrs. Marinthe pays a farewell visit to Dr. Vincent P. Perlo.

Cause Is Unknown But Theories Abound

(Concluded from Page 3)

the anticholinesterase substances might also reverse myasthenic weakness. She was right. In a series of dramatic demonstrations she showed her discovery to the medical world.

An MGH neurologist, the late Dr. Henry R. Viets, happened to be visiting England at the time and attended one of these sessions. Impressed, he returned to introduce the new treatment. With the late Dr. Robert Schwab, another MGH neurologist, he founded the MGH Myasthenia Gravis Clinic. Believed to be the first in North America to treat exclusively this disease, the clinic celebrates its 40th anniversary this year.

On the heels of the first development in myasthenia treatment followed a second: thymectomy (removal of the thymus gland). Known to play a role in the body's immune defenses, this small organ in the upper chest is active in the early years of life but tends to disappear after about age 14.

Since the early 1900s surgeons have been performing thymectomies for a number of reasons. Among them is treatment of thymoma, a tumor in the thymus.

Patients with thymomas develop myasthenia; such persons comprise about 9 percent of myasthenics. Young myasthenics with thymomas experience total and sometimes permanent reversal of their symptoms after undergoing thymectomies.

At Johns Hopkins University School of Medicine, a surgeon, Dr. Alfred Blalock, pondered these circumstances and came up with an idea: If surgery helped myasthenics who had thymomas, might it not also aid those without tumors? Experience soon showed that for patients under age 40 this was generally true.

In the early 1940s Drs. Oliver Cope and the late Richard H. Sweet, of the MGH, also began performing this type of surgery. Of 200 myasthenic patients who have undergone thymectomies at the MGH, 41 percent have so far remained free of any symptoms.

Even with the advent of thymectomy and anticholinesterase drugs, a sizable group of severely ill myasthenics still failed to respond to treatment. In recent years, however, hormones such as cortisone, produced in a gland (adrenal) near the kidney, have been found useful in combatting these more stubborn appearances of the disease. Also helpful is the adrenocorticotropic hormone (ACTH), which stimulates the production of the cortisonelike substances (steroids).

"These medications present a rather complicated situation," Dr. Perlo said, "because the hormones themselves have some adverse side effects if used over the long term. If you can get by without these drugs, you do, but they may get a severely ill patient back to normal functioning when all else fails."

In particularly severe cases of myasthenia, mild infections or other problems may trigger "crises" in which the patient finds breathing extremely difficult. A crisis usually necessitates hospitalization, the use of a respirator, and other special techniques for assisting breathing.

"One other great advance in the treatment of myasthenia is the development of the respiratory intensive-care unit," Dr. Perlo said. "These units have absolutely remarkable methods of helping the patient. At the MGH it's not unusual to see at any one time two or three myasthenic patients being taken care of in the Respiratory Intensive Care Unit while different drugs are tried in an attempt to alleviate their symptoms."

One of the remarkable things about myasthenia is that while physicians have achieved a high degree of expertise in treating it, knowledge about the underlying disease process is scant. A number of theories exist. At the MGH and elsewhere, investigations exploring these are in full swing (see page 1, column 2 story).

Dr. Perlo, an Assistant Clinical Professor of Neurology at Harvard Medical School, is himself engaged in tests of new myasthenia medications. One product of research by him and others is a long-acting anticholinesterase tablet, which has freed patients from having to take dozens of evenly spaced doses every day.

Under the Disguise: Really Two Diseases?

(Continued from Page 1, Column 2)

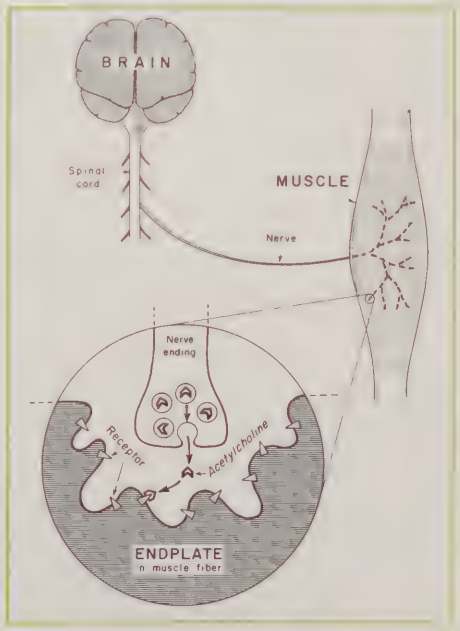
mouth, throat, and respiratory muscles. Third, a difference exists in tissue type, an inherited characteristic of tissue. In young women one tissue type (HLA-8) predominates. In the older males three other types (HLA-2, 3, and 7) appear most frequently.

The MGH investigators have discovered what may prove a fourth distinguishing characteristic. In a group of male patients aged 50 years and more, they found a considerable level of "cell-mediated immunity" against a substance common to all human muscle. One of the body's two main defenses against disease, cell-mediated immunity involves white blood cells called lymphocytes. In male myasthenics immunity of this variety far exceeded not only that of nonmyasthenics but also that of young, female myasthenics.

The target of these immune reactions was a receptor, a chemical normally residing in the area of muscle known as the end-plate. Forming one side of the neuromuscular junction, where nerve and muscle adjoin, the end-plate serves as a receiving terminal for nerve signals. (See drawing ——→.)

In the form of electrical impulses, these signals cause the release of acetylcholine from the nerve ending. Crossing the gap to the end-plate, this chemical triggers the eventual contraction of the muscle. Abnormality in this process produces the weakness in myasthenics.

Patients in the MGH study had agreed to allow the investigators to draw small samples of their blood. After removing the lymphocytes and mixing these white cells with receptor, Drs. Arnason and Richman were able



to measure any immune reaction which resulted.

The receptor employed in these experiments was purified by Dr. James Patrick, now of Dartmouth Medical School. He appears as one of the co-authors of the study reported in June at the annual meeting of the American Association of Neuropathologists.

Since human receptor is difficult to obtain, animal receptor, with its identical chemical structure, is substituted. One animal in particular, the electric eel, provides a plentiful supply.

This native of Brazil's Amazon River possesses a muscle which is used to build up a charge of 200 or so volts. Rather than the usual muscle and end-plate, the eel has only several receptor-laden end-plates in a row.

To separate the receptor from other material in the electric muscle, scientists rely on the weapon of yet another exotic creature: the oriental cobra. This snake's venom paralyzes its victims by binding to the receptor, blocking nerve signals.

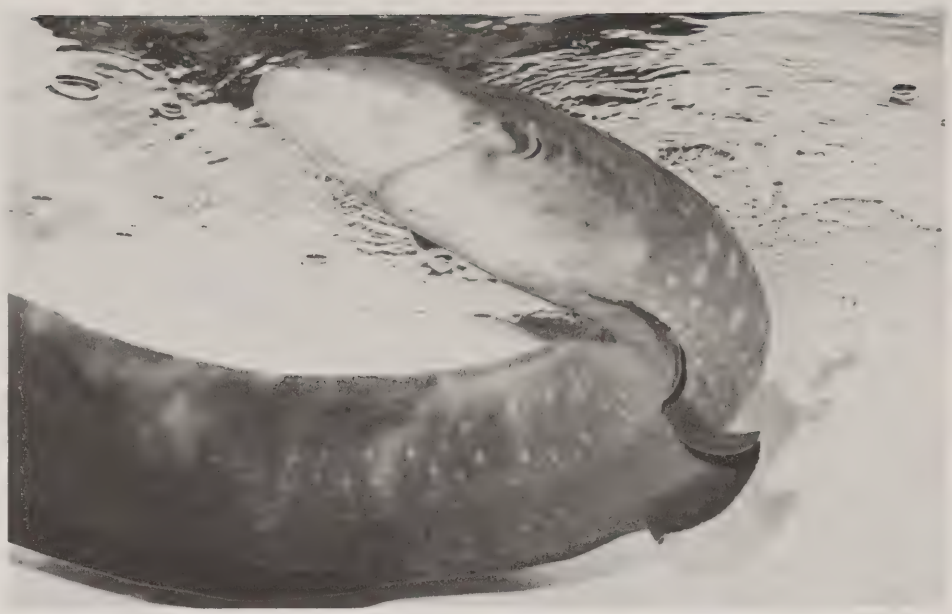
Like a magnet, the venom, or toxin, draws receptor off from the other muscle material. A chemical is then added to cause a reaction which pries the receptor loose.

Although receptor itself has not long been the object of much attention, physicians have for some time suspected that myasthenia is an "autoimmune" disease. That is, the patient's own defenses turn against some part of him instead of against some foreign substance. At a number of centers, studies have revealed that a type of immunity – involving the defensive particles called antibodies as distinct from white cells – may be a culprit.

Recently a group of Israeli investigators showed in myasthenics some immunity in which white cells attacked a mixture of material from muscle. Until the results of the MGH study, however, the existence of immunity involving the receptor specifically remained in doubt. The project received funding through a fellowship to Dr. Richman from the Myasthenia Gravis Foundation and a grant to Dr. Arnason from the Muscular Dystrophy Association.

Increasingly scientists have suspected that the condition might really be two diseases. The MGH research adds to the evidence bolstering this possibility.

The findings of Drs. Arnason and Richman have come at a fruitful time for myasthenia gravis investigators.



The electric eel's electric muscle contains a plentiful supply of a substance vital to much myasthenia gravis research.

With discoveries occurring one after another, there is a growing sense that a major breakthrough in understanding the basic processes of the disease may lie around a nearby bend.

Despite medicine's extraordinary success in controlling the condition (see page 1, column 3 story), this kind of basic knowledge has eluded searchers.

For decades those studying myasthenia have focused their attention on two parts of the human anatomy. One is the thymus, a chest organ active in the early years of life and involved in immunity. The other is the neuromuscular junction.

During the 1960s investigators favored the theory that myasthenia involves some malfunction in the release of acetylcholine from the nerve ending.

"Then in 1973," said Dr. Richman, who is an MGH Clinical and Research Fellow and a Harvard Medical School Instructor in Neurology, "an accidental observation shifted everyone's attention to the receptor, the substance which reacts with acetylcholine and starts everything going in the muscle."

At the Salk Institute of Biological Studies in La Jolla, Calif., two biochemists, Jon Lindstrom, Ph.D., and Dr. Patrick, were using rabbits to produce antibodies to receptor. The scientists followed the usual procedure: Injecting the animals with receptor, the researchers waited for antibodies to appear in the rabbits' blood. Rabbits produce these far more quickly than most creatures.

After three weeks the animals developed a weakness resembling myasthenia. Although themselves unfamiliar with the disease, the surprised biochemists called in medically knowledgeable Salk Institute colleagues. Examining the animals, Mayo Clinic pathologists found that after an initial inflammatory reaction, the muscle end-plates appeared exactly like those of human myasthenics.

In one accidental stroke, the scientists had not only changed the focus of the myasthenia research but had also given the field a new tool. They had created an animal model in which to study the disease – a goal unattained in 100 years of attempts.

In a later investigation at the Salk Institute, Drs. Lindstrom and Vanda R. Lennon also contributed to medical knowledge about antibody immunity in myasthenics. Previous work in this area had revealed such slight immune reactions to receptor that many scientists questioned the significance of the findings.

Drs. Lindstrom and Lennon managed to purify tiny amounts of human receptor and show that myasthenics possessed antibody immunity to it. This finding bolstered earlier results.

Researchers at the National Institutes of Health, Duke University, and Johns Hopkins University are continuing investigations along these same lines.

"At this point," Dr. Richman said, "the question seems to be: Exactly what kind of immunological reactions are these, and how in the world are they related to the thymus?"

(Concluded on Page 6)

Child Abuse Can Turn Victim Into Abuser

(Continued from Page 1)

or institution is forced to ask a court for care and protection of the youngster. At some point to do otherwise would threaten the growth, development, and even the life of the victim.

To defuse a dangerous situation without breaking up the family, therapists often arrange for the abused child to spend part of each day at a day-care center.

And what about the father and mother? Far from being criminal, the abusing or neglecting parent is usually a troubled individual who knows nowhere to turn for help.

Said Miss Deborah Hill, an MGH pediatric social worker and President of Children's Advocates, a Boston-area group concerned with abuse and neglect:

"In the majority of cases the pattern of child abuse is that of an individual with many unfulfilled dependency needs who looks to his child to meet them.

"He has quite a distorted view of the child and the child's needs. This parent may punish him, for instance, for what is really normal crying. To the parent, who has a very poor self-image, the crying is a bad reflection on his child-raising abilities."

Typical of the abusing parent was a mother who recently brought her six-year-old son to the MGH Emergency Ward. A bruise darkened the youngster's right temple. At the homeless women's and children's center where the two were staying, the young mother explained, the boy had collided with a steel door.

But the pediatrician who examined the youngster suspected otherwise. Admitting him for further tests, the physician called in an MGH social worker.

Although the medical tests revealed no problems, evaluation by the social worker disclosed an ominous, tragic picture. The mother, herself abandoned at birth by her own mother, was unmarried. The boy's father had deserted her.

When the youngster was two years old, he swallowed a handful of her medication and was rushed to the hospital. Discouraged, she had relinquished him to the care of his grandmother, with whom he remained for four years.

On reuniting, mother and son were virtual strangers. Hostile and upset on leaving the security of his grandmother's home, the boy constantly peppered his mother with insults. She in turn was seen whipping him with a dog leash. Because of low self-esteem, she also chose boyfriends who beat her, endangering her son as well as herself.

Friendless, bewildered, and depressed, this young mother was trapped in a cycle. She could only turn to her son in a vain search for support and comfort. But this simply aggravated her problems.

After learning these facts and reporting them to the appropriate community agency, the social worker offered regular counseling to the mother and helped her to settle in a new community. In spite of the mother's fears, the social worker assisted her in enrolling her son in school.

The hospital became an anchor for the frightened parent, a place she could turn to for counsel on how to manage her new role with her son. At times she was seen in consultation by other MGH staff members: a psychiatrist for medication, and a neurologist and gynecologist for physical examinations. She was strengthened by the support and easy accessibility of many of the MGH staff. She learned to understand and cope with her son's hostility. Although the two continue in treatment, the hospital team notes that their relationship appears to be far healthier, and the crisis has passed.

Like this young mother, many abusing parents live socially isolated lives. Friendless, they seldom maintain contact with relatives. A common sign of this isolation is an unlisted telephone number or no telephone at all, said Miss Hill, coeditor with Miss Nancy B. Ebeling, also a social worker, of a recent book entitled *Child Abuse: Intervention and Treatment.*

Abuse, however, is not confined to the homeless, poor, or unmarried. It frequently strikes in a wealthy suburb with a ferocity equal to that found in a poverty-ridden area.

The problem follows a number of widely recognized patterns. The most significant of these involves the new generation's adoption of the previous generation's abuse habits. Without intervention an individual maltreated as a child often goes on to batter his own offspring because he sees in his child something he dislikes in himself. Theoretically, being abused makes a person feel worthless and bars him from re-

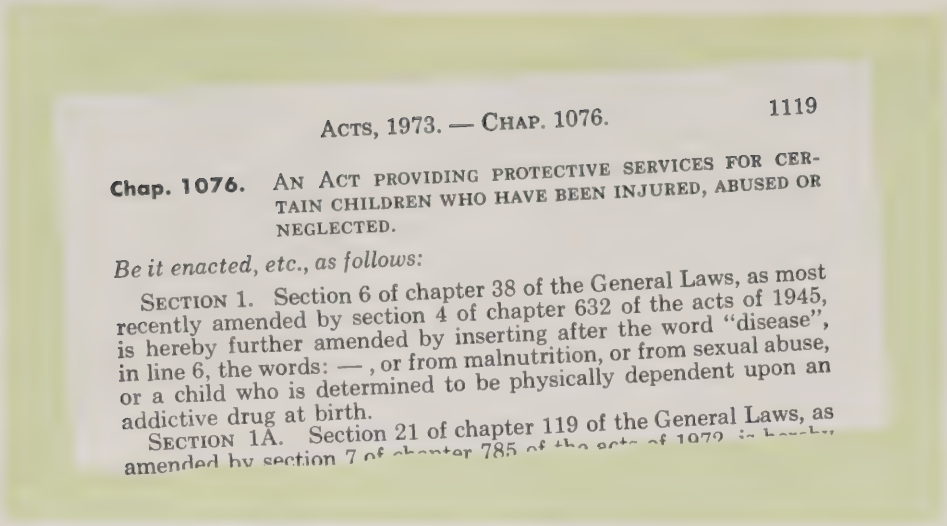
Really Two Diseases? *(Concluded from Page 5)*

That the thymus plays some part in myasthenia, researchers are fairly certain. This organ is thought to be a kind of lymphocyte "factory." The thymus is also believed to produce antibodies in "germinal centers" near its edge. About 60 percent of myasthenics undergoing surgical removal of the thymus turn out to have additional such centers near the *center* of the organ.

Within the thymus is a type of cell (epithelial) which in structure resembles muscle. Conceivably, myasthenics develop immunity to their own epithelial cells, opening the door to mistaken reactions against receptor. One theory holds that a virus enters the thymus, chemically altering its cells and causing the confusion in identities.

In some young myasthenics, investigators were startled to discover recently that lymphocytes from a patient's blood react against his own thymocytes, lymphocytelike cells from the thymus. This information further ties the thymus to the reactions (autoimmune) which may be causing myasthenia.

Three steps in myasthenia gravis research: On left, blood samples are placed in a machine (centrifuge) to separate from them certain white cells (lymphocytes). At center, the cells are put in a growth medium (food). On right, after resting in a fluid filled with radioactive particles, the cells are removed for testing.



ACTS, 1973. — CHAP. 1076. 1119

Chap. 1076. AN ACT PROVIDING PROTECTIVE SERVICES FOR CERTAIN CHILDREN WHO HAVE BEEN INJURED, ABUSED OR NEGLECTED.

Be it enacted, etc., as follows:

SECTION 1. Section 6 of chapter 38 of the General Laws, as most recently amended by section 4 of chapter 632 of the acts of 1945, is hereby further amended by inserting after the word "disease", in line 6, the words: — , or from malnutrition, or from sexual abuse, or a child who is determined to be physically dependent upon an addictive drug at birth.

SECTION 1A. Section 21 of chapter 119 of the General Laws, as amended by section 7 of chapter 785 of the acts of 1972 is hereby

ceiving needed affection, setting the stage for another tragedy. In various studies, investigators have traced abuse back three or four generations.

In theory also, individuals with negative self-images and extensive dependency needs tend to marry abusers, seeking confirmation of their own lack of self-worth. Thus, not uncommonly, while one parent abuses, the other may tacitly condone the abuse for any of three reasons: He may share a wrong view of the child as "deserving" of battering. His need for a relationship with his partner may overpower his capacity to protect the child. Or he may fear physical retaliation against himself.

The victims of neglect and abuse are young: five of every six cases reported involve children nine years old or less; one of three involves children three years or less.

"Abuse commonly occurs," Miss Hill said, "when a parent with the potential to abuse experiences a crisis in his daily life and has no one to turn to for help. As a last resort he turns to the child to meet his needs. When the child is unable to help, abuse may take place."

One physician asserted recently that the battered child is a planned child. He reasoned that the unhappy parents, seeking satisfaction in an offspring, sacrifice to make room in their lives for a youngster. When the child fails to live up to their inappropriate expectations, however, the trouble starts.

Other experts have argued that the abused youngster is the unwanted "accident" who, in the eyes of the parents, brings nothing but hardship.

"The parents who abuse usually have very strong ambivalent feelings toward their children," Miss Hill said. "They love them and need them but at the same time often dislike some characteristic of the child that they similarly dislike in themselves."

Several recent studies have linked the victims of childhood battering to violent crime in later life. Various researchers have interviewed men convicted of homicide. In one project an entire large group of manslayers reported being assaulted as children.

The final question about abuse and neglect is one which investigators feel that they are not in a position to answer by themselves: What can be done to eliminate or at least curtail the problem? Various solutions have been advanced, including tighter laws on the reporting of cases, more extensive resources for intervention, and preventive programs (see accompanying stories). Specialists believe that society will eventually have to choose the approaches it prefers.

But Dr. Guthrie sees an immediate and pressing requirement that people – especially health professionals and others coming into close contact with youngsters – understand what child abuse is all about.

"Everyone who goes into pediatrics," he said, "is attracted chiefly because he enjoys working with children. He will automatically tell the mother what a lovely youngster she has. Well, that's the last thing an abusing parent wants to hear. He would much rather hear an expression of how difficult it must be to raise a family today with all the pressures of money, housing, and survival.

"When you're dealing with an abusive parent, you must focus on his needs. They are very severe."

In the courts, Dr. Guthrie said, the pressing problem has been judges who regard the sanctity of the family unit and the rights of parents rather than what is in the best interests of the child. Gradually, he said, judges are abandoning such attitudes as they become educated about the needs of the abused and neglected.

Abuse and Neglect: The Numbers Swell

The number of reported cases of child abuse and neglect is climbing at an ever increasing rate.

In the Boston area, reported instances of abuse doubled from 1973 to 1974, reaching 273 last year. Statewide, the figure swelled from about 300 to slightly more than 500.

What portion of these increases results from more effective reporting is unknown, but the bulk of Boston-area statistics comes from hospitals. Since they have consistently reported abuse and neglect, the higher figures must reflect some true increased incidence. These rises have apparently followed the growing unemployment rate.

The incidence of abuse varies from state to state and region to region, generally according to the efficiency of reporting systems. Reputed to have the nation's best such system, Denver, Colorado, annually detects about 400 cases per million population. Were an equally effective reporting mechanism extended to the entire country, an estimated 88,000 cases a year would come to light.

With a reporting law ranked among the nation's best, Massachusetts achieves about one-fourth the Denver rate. Amended in 1973, the Massachusetts statute has, since February 1974, required that a broad spectrum of professionals report suspected abuse and neglect.

Those covered by the law include physicians, medical examiners, dentists, nurses, public and private school teachers, educational administrators, guidance counselors, probation officers, social workers, and policemen.

Evidence suggests, however, that some professionals are not fully complying with the law. Thus, although their record has improved somewhat of late, private pediatricians file few reports. Usually a friend of the family in question, the pediatrician may either refuse to believe that abuse is taking place or simply try to protect the parents. The physician may not realize

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Ways to Intervene Before Harm Begins

Hospitals and community agencies can often salvage the home where child abuse is taking place. By the time the problem reaches their attention, however, great harm – both physical and emotional – has already been done. Ideally, physicians and social workers would like to intervene before the problem arises.

In March 1975 at a childhood trauma symposium sponsored by the MGH Pediatric Intensive Care Unit, one of the nation's foremost experts on abuse and neglect outlined a program of prevention employed by his hospital. Dr. C. Henry Kempe, who first drew national attention to these ills in the early 1960s, is chief of pediatrics at Colorado General Hospital and Director of the National Center for Prevention and Treatment of Child Abuse and Neglect.

At Colorado General Hospital prevention begins with pregnancy. Dr. Kempe and his co-workers have compiled a number of clues which can signal before, during, or after the baby's birth that the parent is abuse-prone. Examples of the numerous signs are: overconcern with the baby's sex prior to birth, depression over pregnancy, and lack of eye contact with the newborn infant.

The most important question the pediatrician can ask of a new mother, Dr. Kempe said, is, "Are you having fun with the baby?" If the answer is "no," trouble may be brewing.

In an experimental project, Colorado General Hospital pediatricians offered massive support to parents who appeared likely to abuse their youngsters. One unusual aspect of this successful program was the extensive use of lay volunteers who visited the families and helped in various ways. Not all parents who exhibit the "at risk" signs, Dr. Kempe pointed out, necessarily go on to mistreat their children.

Dr. Andrew D. Guthrie, Jr., an MGH pediatrician, advocates preventive efforts which begin long before the individual seriously considers parenthood.

"What we ought to do," he said, "is to mount an educational campaign to introduce the adolescent to what it is like to be a parent. Child raising is not an easy, instinctive process. It is a learned experience.

"We really ought to interfere with the abuse cycle at an even earlier stage, with elementary-aged youngsters. But given limited resources we could start with adolescence."

Elementary education, he explained, could focus more on general interpersonal skills. It might thus avert some of the social difficulties which people experience in later life.

Any preventive program, Dr. Guthrie said, will be expensive. But he added that in human and financial terms, the price of waiting until abuse or neglect has occurred is far higher.

Abuse Reporting

(Concluded from Page 7)

that referring them for assistance helps protect them from losing control and doing something harmful they do not want to do.

"In the suburbs," said Dr. Andrew D. Guthrie, Jr., an MGH pediatrician, "the last thing the physician thinks of is abuse. Put him in the MGH Emergency Ward, and it will be one of the first diagnoses he thinks of."

In Massachusetts, a professional reports a case of abuse or neglect to the state Department of Public Welfare. The group investigates the report and follows up by providing for social services and medical care. Only as a last resort, when families cannot protect the children, does the Department seek court intervention.

Dr. Guthrie believes that social services should be expanded to care for the growing numbers of children whose plights are being detected. Reports, he said, are outstripping the rate at which the state can intervene.

Could elementary schools help prevent child abuse by focusing more on general interpersonal skills?

MGH News

Vol. 34 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1975

Special Team Out to Curb Overlong Patient Stay

A New Look at a Troublesome Disease

The victim of cystic fibrosis has traditionally been pictured as a thin, malnourished child, barred from an active life, required to sleep at night under a mist tent.

But several years ago researchers found the mist tent unnecessary. In the last decade the survival age of the average patient rose from 12 to 20 years. Most important, many patients stay active well into young adulthood.

"The reasons for this improvement are not entirely clear," said Dr. Allen Lapey, Director of the MGH's new Care, Teaching, and Research Center for Cystic Fibrosis, and Clinical Instructor in Pediatrics at Harvard Medical School.

"In the early days, however, we were often presented with a child who had suffered irreversible lung damage because the disorder was not identified in time. Now physicians in all specialties are aware of how incredibly common cystic fibrosis is."

It is the most common inherited disease among Caucasians (who are affected 10 times more often than Blacks or Orientals).

One of every 2,000 children in the United States is born with cystic fibrosis. Many more – five percent of the population – carry the recessive trait, showing no symptoms of the disorder. When two carriers mate, the chances are one in four that their child will have the disease.

Its cause is unknown. It attacks the body's numerous exocrine glands, which deliver their secretions to organ linings, often by ducts.

For years scientists have suspected that the basic defect lies in transportation of materials across the thin tissues that line organs, especially the tissues of mucous-secreting glands. The explanation, Dr. Lapey speculates, may even be a simple one: that water is abnormally transported, resulting in dehydrated mucus.

Whatever the cause, the key to the devastating effect of cystic fibrosis is the tenacious mucus that thwarts the work of organs throughout the body.

The area most critically affected is the lungs. Chronic cough is an early symptom of the disease in infants. Throughout his life the patient is

(Continued on Page 4)

Space must be available for new patients arriving for emergency admissions.

Everything appeared to be going smoothly for the 61-year-old woman admitted to the MGH last May.

She had entered with hydrocephalus, a swelling caused by a buildup of excess brain and spinal cord (cerebrospinal) fluid in her brain. After a surgical procedure which allowed the fluid to drain off, she was ready to leave the hospital.

Then came the hitch. Following discharge she would need nursing-home care. Despite a search by the hospital and her family, space in a suitable institution could not be found. So she stayed on, occupying a bed at a time of shortage when she required only minimal care. Had no one intervened, Medicare, the Federal health insurance program for the older population, would have continued to pay for her care at the high rates of an acute hospital (one that treats relatively short and severe illnesses).

However, at the end of her first two weeks in the hospital, she reached the 50 percentile mark for length of stay. That is, in the Northeast region 50 percent of patients her age and with her problem leave the hospital after two weeks.

This event triggered the scrutiny of one of the six MGH "utilization review" nurses. As required by Federal regulations, she had first looked into the woman's hospitalization within 48 hours after her admission. The nurse had verified that the patient had entered the MGH for acute services, the only type covered by Medicare.

Some admissions – such as those purely for diagnostic tests performable

(Continued on Page 2)

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EDITORIAL:

Health Care—Strengths and Limitations

Utilization review, the procedure that monitors a patient's length of hospitalization, is regarded by many as a critical concomitant of National Health Insurance. Surely some form of review is necessary. And a front-page article in this issue suggests a means of achieving the same purpose at a fraction of the cost of existing plans.

As important as it is, the concept of utilization review pales beside the more generalized concern involved – the growing encroachment of rigid governmental controls on hospitals. No fair person will deny that hospitals might have prevented some of this governmentalization by actions of their own. Yet the main reasons for the public onslaught against health-care institutions probably center on cost, quality, and universal access to good care. While some better internal braking mechanism might have been possible, runaway hospital inflation largely resulted from three factors: an explosion of technology that improved health care, the need of hospital workers for fair wages, and the massive effects of Medicare and Medicaid requiring more facilities and personnel to provide health care. Concerning the last of these three, one would have to conclude that the nation's hospitals were in no position to control the inflationary effects of Medicare and Medicaid. As for personnel costs, hospitals have had little choice but to increase employee wages. Applying technology was another matter. In some cases there was a tendency to acquire the latest gadget whether or not a particular institution really needed it. By and large, however, these devices saved lives. In balance then, the economies that might have been effected in the three major inflationary areas would probably have saved but a small fraction of the rise in health-care costs.

As for universal access to good care, this was and is a problem. At best the distribution of appropriate health care is uneven. When it is available, it is not always used by those most needing it. A well-thought-out, sensible version of National Health Insurance would improve that situation.

Quality of care is another matter. Despite the claims of detractors who cite national statistics, the health of the United States has improved markedly. Diseases like smallpox and (with use of vaccine) polio have been all but conquered. Diseases that once killed are controllable. People who before were institutionalized can now be rehabilitated to meaningful lives.

What 1975 medicine is unable to do is to rid society of many of the most severe causes of suffering: cigarette smoking, automobile accidents, excessive drinking of alcoholic beverages, and changing mores leading to venereal disease.

(To be continued)

Few Doctors Disagree With Team Decisions

(Continued from Page 1)

on an outpatient basis – are not covered by Medicare benefits. To ensure that patients are receiving acute hospital care, review nurses also screen each person covered by Medicare when the length of stay reaches the 75th and 90th percentiles.

At the time of the 50th percentile, however, the 61-year-old woman was no longer eligible because she did not require acute hospital care. Discovering this, the utilization review nurse called in one of the MGH physicians who act as advisors to the program.

Ratifying her decision, he contacted the woman's own physician, who agreed that his patient was ready for

Photographs in this issue by
Joel Salhanick

Letter to the Editor

Dear Editor:

I was very happy to read in the *MGH News* of March '75 the article on the Total Patient Care Meetings led by Dr. Talbot.

There is no question that Dr. Talbot's ideas influenced my medical approach, and we have followed Total Patient Care in our Endocrine Institute for many years. Dr. Talbot's and Dr. Butter's teaching has contributed to this development.

I enclose the latest Bulletin of our Diabetic Center, which expresses the latest approach of our Total Patient Care. I also enclose a reprint on our approach.

Z. Laron, M.D.
Director, Institute of Pediatric
and Adolescent Endocrinology
Beilinson Medical Center
Tel Aviv, Israel

(Editor's Note: In the reprint the Beilinson Hospital approach is described as one involving the social and emotional aspects of treating diabetics on an ambulatory basis. The approach, which involves the family, is worked out "by a team consisting of a physician, nurse, dietitian, psychologist and social worker; active contact with the school; home visits often with the help of a 'family-to-family guidance program'; and continuous follow-up.")

discharge. He also explained the nursing-home problem.

If the woman's physician had wished, he could have appealed the decision to a higher body, the MGH Utilization Review Committee (September 1968, *MGH News).* This group of some 40 members oversees review activity at the hospital. As yet, however, few physicians have chosen to appeal.

In this case, the reviewing nurse simply proceeded as Federal regulations require. She informed the patient's family that Medicare benefits would cease in 72 hours. With the help of the MGH Social Service Department, which maintains the hospital's Transfer Office, a special unit to cope with this frequently occurring problem (see story on page 8), the family would continue their search for a nursing home.

Since the patient could not afford to pay her own bill, the family would also apply for Medicaid, a state-run health insurance program for low-income individuals.

But no further problems developed, and finally, after a four-and-a-half-week stay, the patient entered a suitable nursing home.

At hospitals across the nation, this story will carry a familiar ring. For utilization review, the quiet child of the Medicare regulations of 1966, has grown up. Already an established part of health-care delivery, the review process is well on the way to directly affecting every patient admitted to an American hospital.

Launched by the Federal government simply to ensure that Medicare did not pay for ineligible services, utilization review has gradually expanded.

For reasons similar to the Federal authorities', state regulations now require the same procedure for Medicaid patients. Other health insurers, such as the nonprofit Blue Cross-Blue Shield, are moving in the same direction.

Behind utilization review is the basic premise that if hospitals more efficiently employ costly facilities, society will benefit from the savings. More specifically, the review process is aimed at keeping the patient out of the acute hospital when he does not need its intensive services.

Many regard utilization review as an absolute necessity for national health insurance. When the government pays the bills, they assert, it will want to know where the money goes.

Across the nation utilization review takes an endless array of forms. Every state, region, and hospital appears to have devised its pet approach. Until recently some hospitals, for instance, have not examined Medicare admissions until fairly late in the patient's stay. Also varying from one institution to the next are the percentiles used as bench marks in rechecking a case.

Reviewing hospitalization data on a number of patients is Barbara Borgese, RN, Nurse Coordinator for the Utilization Review Committee.

The practices of each hospital depend largely on how it interprets a huge complex of Federal regulations. Although some of the rules clearly state the requirements, others are open to interpretation. Not uncommonly, new and sometimes confusing regulations appear several times a year.

Another dimension is being added to utilization review. In some areas of the country, physician groups called Professional Standards Review Organizations (PSROs) have begun monitoring Medicare cases. Unaffiliated with any particular institution, these groups oversee utilization review and potentially quality of care. Required and funded by Federal law, PSROs can delegate individual institutions to undertake their own review, but under the watchful eye of PSRO. Hospitals so delegated are generally larger medical centers where patient load makes self-monitoring practical.

In Massachusetts, the state has contracted with an organization known as the Commonwealth Health Agencies Monitoring Program (CHAMP) to perform all Medicaid review. Of roughly 31,000 yearly admissions at the MGH, about 22 percent are Medicaid (monitored by CHAMP), and another 25 percent Medicare (monitored by the MGH).

Many hospitals limit their review to federally required Medicare. In addition, the MGH review team checks length of stay for all persons carried by other health insurers. At present, the nurses begin monitoring such patients about 15 days after admission. The pickup point fluctuates according to patient load.

"This somewhat unusual technique gives us a convenient way of varying the number of patients we review without constantly expanding and shrinking the number of people on our staff," said Dr. George P. Baker, Jr., an MGH physician and Chairman of the Utilization Review Committee.

Since the state (through CHAMP) began monitoring at the MGH in late 1973, a total of nine patient days involving four patients has been retroactively disallowed for payment. For Medicare, the hospital itself has turned down an estimated 50 patient days a year (a little under one tenth of one percent disallowment rate).

Does utilization review work?

"If applied in a hospital where it has never before been used, it will almost assuredly end up cutting length of stay," Dr. Baker said. "A good program results in the education of physicians about the restriction of the Medicaid law. Once this is accomplished, however, there is some doubt as to whether continued aggressive utilization review significantly lowers length of stay."

In Illinois and California, which had early experience with review, the evidence appears to bear out this point. After one year of rapidly falling lengths of stay, the hospitals found monitoring had little effect.

When a rudimentary form of review was begun at the MGH in the late 1960s, average length of stay was slightly over 13 days and falling. More

(Concluded on Page 4)

Extending the Cystic Child's Active Years

(Continued from Page 1)

plagued with tough, excessive secretions that make the lungs an ideal nest for harmful organisms.

"Failure to thrive" is another common symptom. Malnutrition results from pancreatic insufficiency. With its ducts blocked by mucus, the pancreas cannot perform its role in helping the body absorb nutrients.

As the patient matures, the disorder takes its toll on many areas of the body. Almost invariably, however, the patient succumbs to respiratory complications.

Because preventive therapy now begins earlier, the cystic patient often reaches young adulthood before he runs into serious difficulty. Dr. Lapey believes that the MGH, with its broad range of both pediatric and adult services, has something unique to offer such a person.

"The MGH program is exciting because of the comprehensive approach that can be applied through our many subspecialties," he said.

Recently these resources combined to save the life of Ricky, a 15-year-old boy.

Ricky, left, chats with Dr. Allen Lapey after check-up reveals a clear chest. Several months earlier a team of specialists halted a debilitating lung disease stemming from cystic fibrosis.

Until he came down with chicken pox in December 1974, cystic fibrosis had caused the boy no serious trouble. Then infection took over his weakened lungs and clung stubbornly. He was admitted to the MGH on three occasions early in 1975.

"Each time we were able to clear the infection temporarily, but as soon as he went home, he lapsed into his previous state – losing weight, fatigued, short of breath, obviously failing," Dr. Lapey said. "We could all see that if this continued, we were going to lose him."

They embarked on a series of studies to determine what else could be done for him.

(Continued on Page 5)

Spot Check Could Replace Review System

(Concluded from Page 3)

recently the figure has hovered around 11.5 days.

If the full effect of utilization review indeed wears off after one year, then it will end up costing society far more than it saves, for the administrative costs of the process are high.

Although an accurate total is difficult to determine, those costs amount to at least $250,000 a year at the MGH. If private insurers were to require monitoring as extensive as that of Medicare, the expense could double.

Were hospitals to cut out utilization review entirely, however, physicians might gradually slide back into old habits.

As a way out of this dilemma, some – like Dr. Charles A. Sanders, MGH General Director – have proposed that once the initial period of physician education is complete, hospitals switch to a system of random spot checks. Knowing that these could occur at any time without warning, physicians would continue to guard against overlong hospitalizations. At the same time the hospitals could cut back on their monitoring staffs.

Dr. Sanders compares this system to the way in which the U.S. Internal Revenue Service, by auditing a random sample of returns each year, encourages citizens to pay their taxes.

Dr. Baker pointed out that in addition to utilization review, another factor works to shorten stays at many hospitals – namely, a high census of bed occupancy. In recent months patients have often filled the MGH to 96 or 97 percent capacity. In most areas not one bed goes unoccupied.

At the same time staff physicians have patients they would like to admit but cannot. If one of their colleagues allows his patients to remain in the hospital needlessly, he comes under a great deal of pressure. Therefore regardless of the utilization review program a high census is a primary factor in limiting hospital length of stay.

Many physicians and administrators fear that utilization review will have a dehumanizing effect on health care: Bureaucracy will insert itself between doctor and patient. But this development is regarded by many as a necessary evil if society is to carefully control how its scarce resources are allocated for medical care.

"In the best of all possible worlds," Dr. Baker said, "utilization review will result in increased efficiency in the usage of expensive facilities, but it will also inevitably result in a potential decrease of 'caring' for patients.

"For example: The average patient with a myocardial infarction [heart attack] once went home after three to four weeks. Now, without retarding his recovery, he goes home after two to three. Does that mean that the psychological and emotional pressures on the patient and his family are increased? Yes. Does that mean he doesn't feel as well when he leaves the hospital? Yes.

"Ideally the physician would like to see the patient remain until his recovery is more complete. But the increasing governmental pressure to shorten patient stays prohibits this possibility.

"This is not really the effect of utilization review per se. But it is the effect of a general tendency to try to use the acute facilities of the hospital to their maximum."

"The first thing that came to light was that despite a chest X ray showing diffuse involvement of both lungs, physical examinations had always indicated a concentration of congestion in the right upper lung," Dr. Lapey said.

To investigate this discrepancy, a pediatric surgeon performed a bronchoscopy on Ricky. Using an instrument called a bronchoscope, he examined the tiny air passages within the lungs. The passages of the right upper and middle lobes were indeed filled with secretions. When cleared by suction, they quickly refilled.

In the Pulmonary Unit, Ricky then underwent a highly sophisticated test using radioactive nitrogen gas produced by the hospital's cyclotron. A positron camera, developed at the MGH, recorded the path of the gas through both the tiny capillaries and the air passages of the lungs. The test pinpointed the areas that were functioning abnormally.

The decision that followed was a daring one: removal of the diseased right upper and middle lobes. With this source of infection gone, Dr. Lapey reasoned, the boy's body would have a chance to rebuild its defenses. Such a procedure would never have been attempted on the basis of the chest X ray alone, which suggested that the lungs were too generally diseased to function with lobes missing.

The operation, a palliative lobectomy, was performed by a chest (thoracic) surgeon. Highly skilled specialists in the Respiratory Intensive Care Unit guided Ricky through a rocky postoperative course.

"Now he has an entirely clear chest and is out playing ball, getting stronger all the time," Dr. Lapey said. "He has regained the upper hand."

The teamwork that characterized Ricky's hospital treatment must carry over into the home. To stay on top of cystic fibrosis, both patient and family must be involved in a demanding daily regimen.

Typically the adolescent patient rises early in the morning to prepare for physical therapy. First he inhales a medicinal spray to loosen the stickiness in his chest. Then he stretches out, head lowered, on a bed or plank while a family member pounds his back, chest, and sides to dislodge the stubborn secretions.

This daily chest clearance, repeated for a half hour in the evening, is an essential part of preventive therapy.

In Ricky's chest X ray, white weblike strands indicate congestion throughout lungs. More sophisticated test, however, shows localized damage (see below).

As he goes off to school, the patient must take many of his medications with him. To assure proper nutrition, he consumes four or five pancreatic enzyme pills at each meal. Vitamins and a strict diet compensate for poor absorption.

Often the patient takes several antibiotics daily to control chronic lung infection. In the summer, he may need salt-supplement pills to compensate for loss of salt in sweat.

Patients treated at the MGH center are seen by both Dr. Lapey and the Associate Director, Dr. Aubrey Milunsky, a pediatrician who heads the Genetics Laboratory of the Eunice Shriver Kennedy Center at the Fernald State School for Mental Retardation.

Both encourage the active participation of the cystic child in all normal activities.

"A healthy mental outlook makes all the difference in the world," Dr. Lapey said. "Even chronically diseased patients do amazingly well when they remain active and involved."

In assisting this effort, the physician faces tough questions.

"A major challenge of this disease is maintaining the integrity of these individuals so they believe in themselves and do something productive with their lives," Dr. Lapey said.

"What kind of guidance do you give to a patient who may make it through college but have few active years left? What about his choice of a career, or marriage?"

Cystic fibrosis is so generalized a disease that finding a "cure" would prove extremely difficult, Dr. Lapey stressed. Two recent developments, however, may herald advances in the areas of treatment and prevention.

One is a diagnostic test for newborns. The standard test, too complex for screening purposes, measures the level of salt in a patient's sweat. The new test is based on the discovery that cystics have a much greater concentration of albumin, a protein, in their meconium (the first fecal matter passed by a newborn).

Because albumin can be detected by a nurse using a simple dipstick, the test may provide for the first time a practical method of screening all infants.

A pilot study to measure the effectiveness of newborn screening by the dipstick method is now under way in several centers throughout the country. If successful, the test will make it possible for all cystics to begin preventive therapy at birth. Earlier treatment, Dr. Lapey believes, would extend longevity.

Newborn screening could also provide for the first time a scientific (controlled) method of evaluating therapies.

"No one has placed therapy on really solid, proven grounds," Dr. Lapey said. "Because the disease is so variable, each physician does what he thinks is best for the individual patient."

(Concluded on Page 6)

On left, inhaled radioactive gas, photographed by positron camera, outlines Ricky's lungs. After four minutes (right photograph) he is unable to exhale gas trapped in diseased lobes. Decision to surgically remove right upper and middle lobes followed.

Studying Speech Loss From Brain Lesions

Patients whose brain function has been impaired by disease or injury often find speaking and understanding speech difficult, if not impossible.

Such problems, known as aphasia, are the targets of two unusual studies by an MGH neurologist. His patients – many of them among the numerous American stroke victims – have cortical lesions (alterations in the brain's external layer). Some have aphasia; some do not.

In one project, the investigator is examining a special aspect of such individuals' ability to comprehend speech. The investigation involves measuring how well the patients discriminate phonemes, the individual sounds of speech. Examples are the "t" sound in "talk" and the "i" sound in "spice."

"In this study we're really trying to answer two questions," said the neurologist, Dr. H. Harris Funkenstein of the MGH Behavior Laboratory. "First: Is the difficulty aphasic patients have in perceiving speech a result of trouble discriminating phonemes? And second, do patients with cortical lesions – whether or not they have aphasia – have difficulty differentiating between phonemes?

"We already have a little evidence on the first question from the work of others. The answer is probably, 'not the major difficulty.' That is, aphasic patients who have problems comprehending complex commands and sentences may nevertheless do rather well in telling phonemes apart. On the second question we also have a preliminary answer: 'Patients with cortical lesions in general find the task no more difficult than understanding speech itself.'"

Much work lies ahead, however, before Dr. Funkenstein will be prepared to draw a final conclusion.

Concerning the brain and its relationship to speech, the neurologist said, very little is known. What evidence has surfaced sometimes appears confusing and contradictory.

While a number of investigators have reported that patients with aphasia experience little difficulty discriminating phonemes, a Russian neuropsychologist, for instance, has published findings to the contrary. Unlike the others, however, the Russian studied head-injury patients. This distinction, Dr. Funkenstein believes, may be important.

SHa	Va	Za
THa	Sa	Fa

A chart showing some of the consonant phonemes of the English language, followed by the letter "a." Such charts are employed in phoneme testing.

Most of us, Dr. Funkenstein said, do remarkably well at deciphering what others say.

"Each of us has a slightly different sound to our voice, which makes it unique. Women's and children's voices, for instance, are far higher in pitch than the adult male's. Linguistically, however, those differences have no significance. Our brains somehow assimilate all of them to the same linguistic unit – a phoneme."

Even under the worst conditions, this superb ability to comprehend persists. In one study a researcher removed a stretch of certain sounds characteristic of a particular phoneme from a short, taped speech and substituted a little cough. Asked to listen to the tape, normal individuals had no difficulty understanding what was said. Most, in fact, failed to notice the cough.

Many persons with cortical lesions, however, present a very different picture. In research supported by a grant from Hyam's Trust, Dr. Funkenstein has been testing the speech perception of such patients by asking them to discriminate among short lists of words. Each word differs by a single phoneme:

In a demonstration of how he tests patients for phoneme discrimination, Dr. Funkenstein operates the tape recorder. Listening to the sounds on the tape, the patient points to the picture of the object whose name he thinks he hears.

CYSTIC FIBROSIS

(Concluded from Page 5)

Opinions differ widely, for example, on the use of antibiotics. In order to prevent lung disease, some physicians prescribe medication as soon as cystic fibrosis is diagnosed. Others, fearing long-term ill effects from the drugs, reserve use until infection occurs.

"We desperately need a cooperative double-blind test effort [one in which neither the investigator nor the patient knows who is getting the drug and who, a dummy medication] involving many centers and many patients throughout the country," Dr. Lapey said. "If we were able to make the diagnosis at birth, all patients could begin their regimens at the same time, and we could learn much about different treatments."

The second important development is in the area of prenatal diagnosis. There is at this time no "genetic marker" to flag the person who has cystic fibrosis or carries the trait. Research at several centers, however, has recently uncovered a factor, or characteristic, produced by fibroblasts (cells) in tissue culture.

"There is great hope that this factor can some day be measured in amniotic fluid [that which surrounds the embryo] so that the fetus can be identified as a cystic child, a carrier, or a normal child," Dr. Lapey said.

For couples who have a history of the disorder in their families, such a test could remove the fear of bearing children. It holds the promise, in the long run, of reducing the incidence of cystic fibrosis.

In the meantime, centers like the MGH are pooling expertise from many fields to extend the active years of the young patient.

the words "limp" and "lamp," for example.

One of those tested was a man who had been injured in a hit-and-run accident 15 years ago. Immediately following the injury, he could barely utter or understand a word. Although he has recovered sufficiently to speak haltingly, his comprehension of the spoken word has changed less.

In being tested, he displayed marked difficulty in discriminating phonemes. While he continues to match spoken words to pictures almost perfectly if those words differ by several phonemes, he performs only slightly better than chance when the words vary by only one.

He does, however, retain the ability to write and comprehend written language. And amazingly, this 55-year-old man works in industry as a supervisor. He and his co-workers have adjusted to communicating through notes.

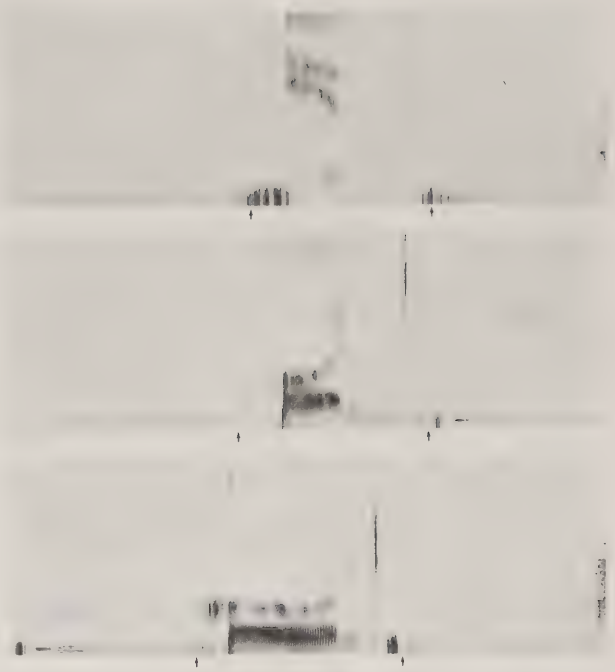
In general, patients with severely compromised comprehension find nearly impossible Dr. Funkenstein's test involving words differing by a single phoneme. To less afflicted aphasic individuals, on the other hand, it is child's play.

To counter this experimental drawback, Dr. Funkenstein plans to make the test more difficult for mildly aphasic patients. Thereby, he intends to discover any slight phonemic problems which his original test failed to measure. One possible ploy is to introduce distracting background noise. By using varying noise levels, Dr. Funkenstein hopes to discover whether the abilities of normal and aphasic patients to discriminate phonemes fall off at the same level.

In addition to his major interest in investigating phonemic discrimination, Dr. Funkenstein will look into the problems that patients with cortical lesions have in uttering speech.

Several years ago one such person suffered a mild stroke which left few ill effects. In 1972, however, she was again stricken. At age 37, she now has problems understanding what others say. In speaking she substitutes one letter for another. Thus, she might say "tie" for "sigh." In listening she apparently does not make the same mistake.

In studying patients like her, Dr. Funkenstein is using a speech spectrograph, a machine that analyzes "voiceprints." With this device he is examining some of the acoustic qualities of speech. These include features such as loudness, pitch, tone, and duration.



"Voiceprints" (from top to bottom) of the words "Hid," "Hood," and "Who'd." Arrows at bottom indicate approximate beginning and ending of words. The tall configuration in the middle of each word contains the vowel sounds.

With the aid of the Speech Communications Laboratory and the Research Laboratory of Electronics at the Massachusetts Institute of Technology, he will utilize special computer programs designed for this purpose.

At this point, however, he is a little uncertain about the direction this study will take:

"Unfortunately, there is almost an unlimited number of things you can look at. Two of them that are relatively easy to study are vowel duration and the extent to which the shape of the vocal tract is correct when making a vowel.

"It turns out that there is a very nice theory that relates the shape of the vocal tract in normal persons to their speech output. From the output you can predict mathematically what the vocal tract looks like while that sound is being produced."

Serving on the staff of Cambridge City Hospital and as an Instructor in Neurology at Harvard Medical School, Dr. Funkenstein hopes that the results of his studies will develop into diagnostic aids. Some patients, he pointed out, recover completely from aphasia. Others recuperate partially. Some stand still.

Although it is known that the size of the stroke injury plays a role in the process, neurologists have no clear idea of why some individuals recover and some do not.

Dr. Funkenstein hopes to learn the patterns of recovery by following each patient and carefully correlating his ability to speak and understand speech with other factors such as his gait, his memory, and the precise location of his lesion. Dr. Funkenstein also wishes to fill in some of the many gaps in man's basic knowledge of how the speech mechanism of the brain functions.

NURSING HOMES

(Concluded from Page 8)

of nursing-home beds years ago. *In 1964 the Social Service Department established a unit known as the Transfer Office to assist patients in finding suitable long-term care facilities or home services. It is believed to be the nation's first transfer office.*

Staffed by nurses, it works with the patient's physician and the social worker assigned to his floor to assess the patient's needs. With the knowledge they have amassed about beds, services available, and community resources, the nurses then match the patient to a program of care. The elderly man who requires a special diet, for instance, might fare best in a nursing home known to have an excellent dietitian provided that it also demonstrates ability to meet his other care needs.

In 1972 Massachusetts enacted a law requiring all hospitals to establish continuing-care units. And with good reason, according to Miss Clark. Statewide, the average patient waits from 25 to 41 days for a nursing-home bed, depending on the level of care needed. At the MGH he waits 9 to 10 days.

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Nursing Home Search: A Major Challenge

Efforts to reduce hospital stays have helped bring to the surface a problem which has been plaguing Massachusetts for over a decade.

A severe shortage of quality nursing-home beds is forcing many disabled and elderly patients to remain in costly, acute hospital facilities long after the patients need them.

Highlighting this problem are the "utilization review" processes (see page 1 article) required by the Federal and state governments as well as Blue Cross-Blue Shield. These programs are aimed at ensuring that government health insurance programs do not pay for ineligible or unneeded care.

At many hospitals utilization review mechanisms encounter a recurring picture: The elderly patient is ready for discharge. His physician realizes it. But the patient needs a nursing home, which cannot be found.

Although this shortage affects many parts of the nation, the nursing-home bed scarcity appears to be hitting Massachusetts particularly hard. Just how hard was revealed in a Massachusetts Department of Public Health study released in March. It disclosed that on March 20, 1974, 941 patients were waiting in acute hospitals throughout the state to be placed in nursing homes, rehabilitative institutions, or chronic-care hospitals. The 941 were forced to linger in acute hospitals for a total of 26,985 days after becoming ready for discharge.

According to Miss Eleanor Clark, Director of the MGH Social Service Department, some of the nursing homes always have empty beds. But many of these establishments are of such low quality that patients would not receive the level and quality of care required.

"If we sent patients to some of these facilities," she said, "we would just create a revolving door. With inadequate nursing care, the patient develops complications such as bedsores or pneumonia, and comes right back into the acute hospital.

"Discharging a patient with complicated problems into any nursing home just because it had an empty bed would be consigning an elderly person to absolute misery. Patient-care needs must be matched with the facility's capacity to meet them."

Four factors, she believes, have combined to create this situation: stricter fire and safety regulations, state certificate-of-need policies, tight reimbursement guidelines for Medicaid patients, and a large number of mental-health hospital patients discharged to nursing homes.

Joanne O'Brien, RN, Transfer Office Supervisor (left), confers with aides Therese Statz and Barbara Noonan, RN, on suitable nursing home for patient.

Under the certificate-of-need law, anyone wishing to build a nursing home or augment an existing one must obtain the state's permission. Massachusetts keeps an unusually tight rein on construction.

Through the Rate Setting Board the state also has held nursing-home charges tightly in check. This practice has curbed profits.

"It is very tricky for the honest, efficient businessman who wants to run a good, well-staffed nursing home to do so and still make a profit," Miss Clark said. "He's doing it as his life's business and expects something in return for his work and investment.

"Somehow many businessmen have managed to operate good homes, but it is becoming more and more difficult."

Medicaid, the state-run health insurance plan for the medically indigent, often lets its nursing-home bills go unpaid for years on end. As a result, many honest operators accumulate debts. Others simply refuse to accept Medicaid patients.

To create an adequate supply of quality nursing-home beds, Miss Clark said, government must at once begin encouraging nonprofit nursing homes. In her opinion the day of the profit-making home must come to an end.

"I don't think that the country can afford to pay even the eight percent profit the honest businessman would like to make, especially when it comes on top of today's very expensive health-care dollar."

Lately Miss Clark has been encouraged by growing attention paid the nursing-home problem by the state Department of Public Welfare. By closing 23 substandard facilities last year, she noted, the state has attacked the quality issue. In turn the closings have aggravated the shortage. The problem of scarcity awaits sufficient action.

Like other hospitals, the MGH became painfully aware of the scarcity

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MGH News

Vol. 34 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1975

Evaluating New Tool to Fight Some Lung Failures

"Intensive" Care Reduces Psychiatric Costs

The MGH Inpatient Psychiatric Service has become what might be called a "psychiatric intensive-care unit."

Over the past two years it has adopted an "intensive" treatment approach designed to meet the needs of its typical patient: the person suffering an acute, sudden emotional or psychological crisis.

While hospitalized, the psychiatric patient has traditionally spent a relatively small percentage of his time actually undergoing therapy. But at the MGH that has changed. By harnessing the services of highly trained psychiatric nurses and social workers to supplement the physician, the hospital fills as many hours of the patient's day as possible with group and individual psychotherapy.

The most tangible result of this new approach is a dramatic decline in length of stay. Two years ago, the patient went home after an average of 45 days. Today it is 25 days. Thus for an average hospitalization the shortened stay means a saving of $2,800 and has made room for 30 patients a month. Previously, the service averaged 15 admissions monthly.

According to current psychiatric opinion these statistics should translate into better care. While protracted hospitalizations may be necessary for some persons with chronic mental illnesses, the same does not hold true for patients with acute problems. For the bulk of such persons shorter admissions may lead to more effective treatment.

As practiced at the MGH, this intensive-treatment approach has acquired some apparently original touches. To help a patient adjust to his sudden departure from the ward's supportive environment, for instance, the hospital employs a "transition group."

Shortly before his discharge and for about two weeks afterward, each patient belongs to this innovative program. The members meet regularly to discuss the problems of transition and to work them out together.

While the transition-group idea may be unique to a general hospital, the intensive approach is not. Over the last decade or so, many of the nation's other general hospitals have increasingly turned to such a program or similar ones with the same overall aim. This trend reflects a deepening involvement of such hospitals in the care of psychiatric inpatients.

In following this course the MGH

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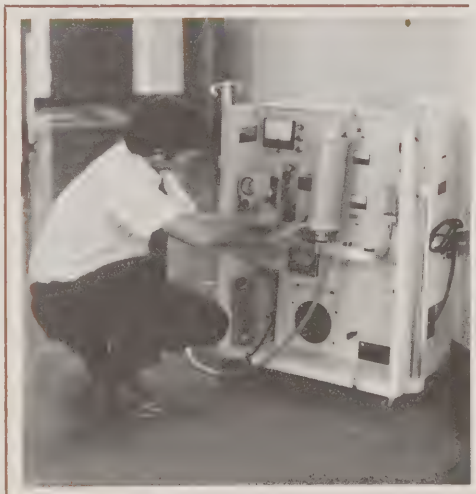

Dr. Warren Zapol installs oxygenator on machine that will send patient's blood through the artificial lung and back to the patient.

Acute respiratory failure claims up to 150,000 American lives each year, but a $300 cylindrical device, only 12 inches high, may enable doctors to lower the toll at least a little.

MGH and eight other major medical centers around the nation are in the midst of a government-financed, three-year, $6 million program to test the therapeutic effectiveness of an artificial lung which operates outside the body.

Since acute respiratory failure can be caused by any one of a variety of conditions, doctors must be highly selective in nominating patients to use the device known as an "extracorporeal membrane oxygenator" (ECMO).

"It is not a panacea by any means," cautions Dr. Warren M. Zapol, an MGH anesthesiologist. "But even if ECMO helps only a few, it will be an invaluable life-support system."

Working under Dr. Theodor Kolobow, Dr. Zapol helped develop a spiral-coil type of membrane oxygenator at the National Heart and Lung Institute in Bethesda, Md.

"It is a tool," Dr. Zapol said, "which buys time so that the ailing lung can rest and hopefully aid the body's natural healing processes."

During conventional respiratory treatment using a mechanical ventilator (respirator), if a patient's ability to transport oxygen into his bloodstream continues to decline, a physician can step up the concentration of oxygen in the air the patient breathes. However, too great a concentration might result in additional injury to the lungs.

The ECMO, on the other hand, can deliver adequate quantities of oxygen directly to the patient's blood and re-

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EDITORIAL (Second of two parts):

President Ford Should Act Now

Blamed for many problems beyond their control, hospitals are the targets of increasing consumer-group and governmental attacks. Already the health-care field is overwhelmed by the growing mountain of paperwork and confusing array of government directives, counter-directives, and counter-, counterdirectives.

Often these days the harried hospital chief executive wonders whether he or the government is running the institution. When he wishes to buy a new machine that he knows will significantly improve the care of a large number of patients, he must prepare a lengthy document. Delays engendered by politics or bureaucracy often set the acquisition back a year or more. If a new building is required, the documentation demanded frequently necessitates hiring experts to perform studies to prove what is already known or what only experience can discern. All this is extremely expensive. Even so, there is no certainty that the expenditures will result in approval of the proposed construction. More serious is the cost in human suffering whose alleviation awaits the acquisition of the new device or the addition of the new examining rooms. Rigid regulations now being considered in Washington might force the physician to order tests he deems unnecessary and deliver care in a way he deems unwise.

And a pending state proposal known as Chapter 424 would confine hospitals in a straitjacket. Even internal departmental budgets would come under state scrutiny.

Thus the red tape stretched from Washington and the state capitals occasionally tangles hospital administrations so effectively that critical changes take years to accomplish. Government regulations intended to protect and benefit the consumer often end up hurting him – both in his health care and his wallet. In the desire to make every hospital conform to a minimum standard, government is strangling initiative and smothering innovation. To be sure, poorer hospitals may be raised to the minimum standards sought. Obviously that is laudable. At the same time, however, the better hospitals are in danger of sinking to the level of the minimum standards they already greatly exceed.

What the health-care system needs now from government is a commonsense partnership to determine the optimal way of achieving what everyone wants: the best care attainable for all at a cost the nation can afford.

To reach this goal demands a certain amount of fluidity. Rigid regulations stifle, but flexible guidelines can provide a framework within which hospitals will be free to create the best possible environment to meet the needs of their own patients rather than some mythical patients who conform to an enigmatic national norm. This suggests a flexible national model that assures the patients of good care but leaves to each hospital and region the self-determination needed to mold the institution that will truly serve its own patients.

To produce a national model the President should establish a task force consisting of the public, the government, physicians, and hospital administrators. Unless experts in the private sector of health care are adequately represented, however, such a committee would produce a well-intentioned but harmful document favoring further governmental intrusions. With the need so great the President should act now.

Sugar Substance May Assist the Ailing Heart

MGH investigators are trying to determine whether a type of sugar can help reverse what is apparently a serious, sometimes fatal aftereffect of the heart attack. The suspected aftereffect is cell swelling in the part of the heart deprived of blood flow.

This new, highly experimental technique is among the latest contributions of the MGH "Program Project," a massive study of heart, lung, and kidney disease, about to enter its 15th year. Primarily funded by a National Heart and Lung Institute grant and headed by Dr. Alexander Leaf, Chief of MGH Medical Services, Program Project draws on the expertise of some 20 physicians. Since the study began in 1961, it has focused mainly on heart disease.

During the 1960s members of the Program Project team helped develop a number of sophisticated medical and surgical techniques for assisting the victim of a heart attack. With the use of such methods and the advent of the

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coronary intensive-care unit, the percentage of heart-attack patients who die in the hospital has halved – from about 30 to 15.

Among this 15 percent, the failure of the heart in its role as a pump is the major cause of death. That is, the heart becomes so weakened by the death of oxygen-deprived muscle tissue that it can no longer function.

Such tissue death (necrosis) also occurs in patients surviving heart attacks and may leave the patient more vulnerable to another attack. Necrosis ensues despite drugs, surgery, and mechanical devices employed to strengthen the organ and return blood to the oxygen-starved region.

Why? Physicians are not sure. But they have a theory, supported by some circumstantial evidence. They base their case on what befalls individual heart cells when their blood supply is interrupted.

In all animals substantial quantities of the metallic element sodium reside in the spaces between cells. So does a vast amount of water. Water easily crosses the cell wall. Sodium penetrates with more difficulty. Ordinarily, however, sodium tends to accumulate inside each cell.

Here the principle of osmosis steps in: Place a substance on one side of a membrane – such as a cell wall. Dissolve another quantity of the substance in a liquid and deposit the resulting solution on the other side. If the liquid crosses the membrane more easily than the substance, the liquid will do so until the fluid on either side of the barrier contains equal concentrations of the substance.

Thus, water tends to flow into the sodium-laden cell. Since excess water would disrupt the normal activities of the cells, they continually pump out the accumulating sodium under normal conditions. Pumping requires energy supplied by nutrients in the blood.

"We have evolved our research in this area around the concept that individual cells within the heart become swollen with water when their blood supply is interfered with," said Dr. W. John Powell, Jr., an MGH cardiologist. "We think that these cells then compress the blood vessels which are necessary to bring them nutrients. The lessening of blood supply causes a further decrease in the function of the cells and leads to their eventual death."

Photographs in this issue:
Pages 1, 3, 5, 6, Joel Salhanick;
p. 8, courtesy of Emmanuel Church of Boston.
Drawing in this issue:
Page 4, Sidney Rosenthal.

Luis Guererro, left, head technician in Dr. W. John Powell, Jr.'s physiology laboratory, adjusts pump that will deliver mannitol to the heart while cardiac device to regulate blood flow is controlled by Michael Bissanti, technician.

In recent years Dr. Powell and his co-workers have been experimenting with a substance which appears to draw water out of swollen cells. In animal tests the investigators have shown that a sugar named "mannitol" can dramatically increase the amount of blood returning to a previously deprived heart muscle.

For mannitol the cell wall forms a nearly impenetrable barrier. Water must leave the cells to create a solution with the sugar.

Mannitol has a potentially undesirable side effect. Its action is probably not confined to oxygen-starved heart muscle. If administered in large enough doses, this sugar will draw water from otherwise healthy cells throughout the body.

This water, when added to the circulation, increases the volume of fluid which the heart must pump. For the victim of a very severe heart attack, this extra volume could overload the system.

To define the limits of mannitol use, the investigators are planning further animal studies.

"It appears," Dr. Powell said, "that when the heart-attack patient gets his first pain, he is not immediately predestined to experience a certain amount of death of heart muscle. If appropriate measures are taken, even hours later, it may be possible to salvage a portion of his heart which otherwise would have died.

"Part of our animal research will be directed toward finding out exactly how long an individual muscle can tolerate total interruption of blood flow and still be revived."

In addition to the so-called "Program Project Grant" from the National Heart and Lung Institute, this work will receive funding from the Ischemia Specialized Center of Research and a contract from the National Heart and Lung Institute to study preservation of blood-obstructed heart muscle (ischemic myocardium). This is also a National Institutes of Health program.

Under Dr. W. Gerald Austen, Chief of MGH General Surgical Services, a number of investigators have been conducting surgical studies of cell swelling in animals.

During certain types of major operations required to save extremely ill patients, it often becomes necessary to clamp off an artery and suspend blood flow to a particular region. In protecting the cells of that region, surgeons have found a number of techniques useful. These include administration of mannitol or a combination of potassium (an element), insulin (a hormone), and glucose (a sugar). Hypo-

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Artificial Lung Saves Life of MGH Patient

(Continued from Page 1)

move carbon dioxide without incurring the risks of high-oxygen concentrations or pressures from the respirator.

In the human lung, blood flows through minute blood vessels (capillaries) wrapped around millions of tiny sacs called alveoli. Molecules of oxygen pass through the walls of the alveoli and capillaries into the blood. At the same time, carbon dioxide diffuses in the opposite direction, leaving the blood. In the oxygenator, a thin sheet of silicone rubber (membrane) substitutes for the alveolar and capillary tissue.

The oxygenator has saved lives, but because the bypass procedure has been used to try to save only desperately ill patients for whom all conventional treatment has failed, just a few such patients have survived.

Twenty-eight people have received oxygenator treatment under the nine-hospital evaluation program contracted for last year by the National Heart and Lung Institute's Division of Lung Diseases. There were two survivors, including a patient at the MGH.

Worldwide, 50 bypasses were carried out during the past year with 5 patients surviving. In 20 of the cases, the oxygenator used was the spiral-coil device.

The mechanism was credited with saving the lives of a 37-year-old Springfield man at the MGH and a young girl who was rushed to Toronto General Hospital in May with a number of blood clots in her lungs (multiple pulmonary emboli). She was cared for by a former MGH chief surgical resident, Dr. Joel Cooper.

Four bypasses have been done at the MGH as part of the federally backed program. Of three patients who died, one initially had shown improvement. The fourth patient is doing well seven months after his intensive hospital care which covered a three-week period.

"He came in last April with viral pneumonia," said Dr. Zapol, an Assistant Professor of Anesthesia at Harvard Medical School. "He was cyanotic [turning blue] and breathing fast. Physicians had inserted a tube into his trachea [windpipe] to facilitate his breathing.

"He had spots all over him. It was a chicken-pox virus. Chicken pox is not common in adults but can be quite serious when it does occur. He was suffering severe acute respiratory failure."

The Springfield man spent 48 hours on a conventional respirator, then 50 hours on the oxygenator.

Working as a team with Dr. Zapol on this project at the MGH are Drs. Henning Pontoppidan, Chief of the Respiratory Unit, Michael Snider, Robert Schneider, and Michael Rie.

The cooperation of the Blood Gas Laboratory, Hematology Unit, and the nurses of the Respiratory Intensive Care Unit has been vital to the project's current success.

In evaluating the oxygenator, coordinators of the national study use only results involving patients between ages 12 and 65. Ironically, the MGH has been getting only young people. At 37, the MGH survivor was the oldest patient treated here on the bypass.

Also, the national study excludes patients with rapidly fatal malignancies and other major illnesses that would preclude their survival, even if they did recover from their pulmonary problem.

In about 30 percent of the bypass cases, the patients had developed respiratory failure from septicemia, a blood-borne infection that could originate in any organ.

A technique advanced by Drs. M. Terry McEnany and A. John Erdmann III, MGH cardiac surgeons, is being employed widely in the bypass procedure.

First, blood is drained via a catheter (tube) from the right atrium (an inflow heart chamber) through a femoral (thigh) vein and is processed in the oxygenator. Then, using the McEnany-Erdmann system, a catheter, inserted into a femoral artery, returns the oxygen-rich blood, carrying it up the main artery (aorta) to where it can directly supply arteries feeding the heart and brain.

Previous methods did not distribute oxygenated blood directly to the heart and brain.

Extracorporeal oxygenation of the blood is not a new technology. It dates as far back as 1850 when it was used in physiology laboratories to keep isolated organs in good condition for study. With the development in the 1950s of heart-lung machines used in open-heart surgery, the procedure began to draw wide attention.

These machines, called "bubble oxygenators," are fine for their purpose. But if they are used for more than six hours, blood damage results from direct contact between blood and air. There is a progressive breakdown of red cells, a loss of platelets (the cellular elements necessary for normal clotting), and poor blood flow with concomitant organ swelling.

All respiratory-failure patients undergoing long-term support with these oxygenators have died.

The far more gentle membrane oxygenator works without contacting blood to gas and can therefore serve as a life-support system for a much longer period.

The ideal membrane has not yet been found. Blood tends to clot on the plastic surface of an artificial lung,

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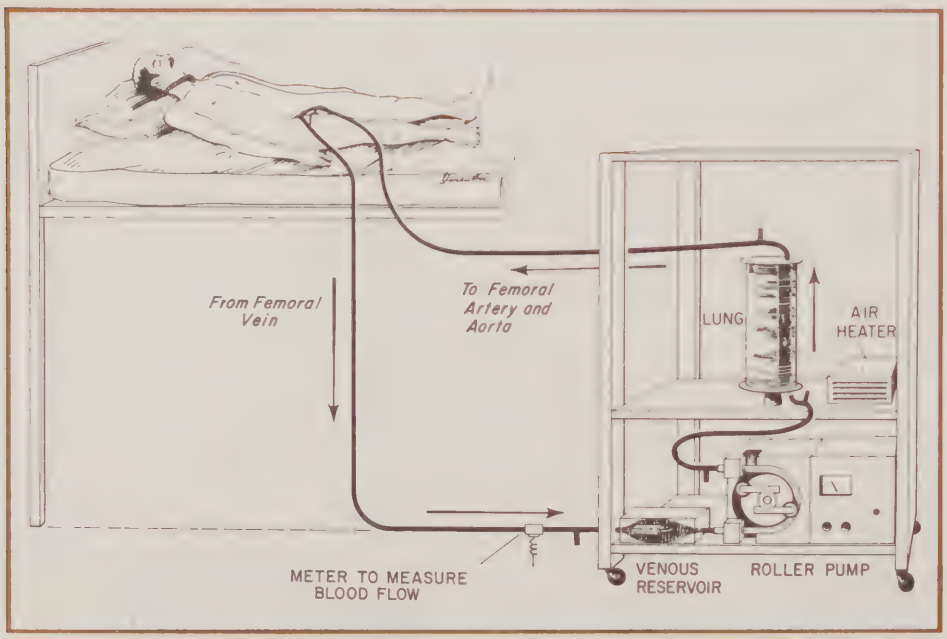


Diagram demonstrates use of spiral-coil membrane lung to oxygenate blood of patient suffering from acute respiratory failure.

Mental-Medical Problems Are Often Linked

(Continued from Page 1)

is responding to a number of influences.

Chief among them is the desire to integrate more closely the patient's psychiatric care with his general medical care.

"We think that one cannot view psychiatric illness as distinct from other sorts of medical problems," said Dr. John C. Shershow, Director of the MGH Inpatient Psychiatric Service. "Psychiatric illness frequently accompanies medical illness. And medical illness certainly complicates psychiatric illness."

In an indirect way, the community mental-health movement has also acted as an influence. One of the movement's central theses is that psychiatric treatment is most effective when provided by the institution normally furnishing the person's health care. In practice, this often means outpatient care as opposed to hospitalization.

But what happens when a person has an acute psychiatric problem and truly requires inpatient care?

For MGH psychiatrists that question is often raised by regular patients at the hospital. They frequent the Emergency Ward and Clinics, which are usually close to their homes. With its familiar surroundings the hospital becomes an obvious first choice for their inpatient psychiatric care.

The patients of the MGH Inpatient Psychiatric Service fall roughly into two categories: those suffering from a purely psychiatric complaint and those whose psychological or emotional problem accompanies a general medical one.

An example of the latter is a middle-aged woman who entered the MGH recently for treatment of a severe ulcer in the duodenum, the first part of the small intestine. While treating her, physicians noticed that she appeared extremely depressed, was constantly crying, slept very little, and refused food.

The patient, who had been experiencing job and marital difficulties, talked seriously of suicide. After a physician from the MGH Psychiatric Consultation Service had seen her, she was transferred to the Inpatient Psychiatric Service.

While undergoing intensive therapy there, the woman also received medical treatment. This consisted largely of rest, medications, and a special diet – all designed to promote healing of her ulcer. After three weeks she went home, rid of both ulcer and depression. Easing her abrupt departure from the ward was the transition group, of which she remained a member for several weeks. As an outpatient seeing a psychiatrist, she is continuing to work on her problems.

The patient with purely psychiatric difficulties is exemplified by a college student who came to the Emergency Ward complaining of headaches, dizzy spells, and problems with his memory. The physician who examined him found no apparent physical cause but suspected the origin of his symptoms was emotional. Since the young man could not function normally at home or school, he was admitted to the MGH Inpatient Psychiatric Service.

Exploring the lingering possibility that the student might have a brain tumor, psychiatrists continued to perform neurologic tests. The results proved negative. The patient had in fact suffered both social and academic setbacks which had become too much of a burden for him to cope with.

Following four weeks of concentrated treatment, however, he recovered sufficiently to leave the hospital with the aid of the transition group and continue as an outpatient. His schoolwork, which had been suffering prior to his admission, greatly improved.

In addition to making possible this kind of short and successful hospitalization, Dr. Shershow said, the new approach on his service is facilitating the training of resident physicians. Further, he has begun conducting a special study of all patients admitted to the ward. The object is to sharpen the doctor's ability to distinguish those few who might fare better if referred to a long-term care hospital.

(Concluded on bottom of Page 6)

Artificial Lung

(Concluded from Page 4)

destroying its usefulness, unless the anticoagulant drug heparin is administered. And since patients with acute respiratory failure often bleed into their lungs, heparin can make bleeding difficult to control.

Silicone rubber also has the ability to destroy platelets.

Dr. Zapol said that Arthur D. Little Inc. of Cambridge is working under sponsorship of the National Heart and Lung Institute to develop and test new materials for use as membranes.

Much discussion has taken place about the feasibility of implanting artificial lungs to replace irreversibly damaged organs. But this undoubtedly is a long-range goal.

Besides clotting there are several other drawbacks:

1. At peak efficiency, the present artificial lung can meet only the requirements of a resting patient.

2. The artificial lung constantly contains more blood than a natural lung. This high volume contributes to blood clotting and damage.

3. The heart would have to propel blood through the artificial lung at 20 times the driving pressure required by the natural lung.

4. The present artificial lung is too large to be placed in the human chest.

Dr. Zapol commented:

"We can now offer help only to those whose lungs can repair within several days. Our short-term goals are aimed at ensuring the safety of this borrowed time."

Members of the MGH inpatient psychiatry team meet to discuss the care of a patient. Left to right: Dr. John C. Shershow, Director of the Inpatient Psychiatric Service; Dr. Alan Robertson, Chief Resident; Barbara J. Buckley, Social Worker; Jacqueline T. Sears, RN; and Ann Kennedy, RN.

Studying Mannitol's Role in Kidney Ailments

(Continued from Page 3)

thermia (cooling) has also showed promise. At lower temperatures the cells require less energy to function.

MGH surgeons contributing to Program Project include Drs. Eldred D. Mundth, Mortimer J. Buckley, M. Terry McEnany, and A. John Erdmann III.

In another section of the massive project, investigators are looking into the possibility that mannitol may reverse damage incurred when blood flow to the kidneys is interrupted. Such interruption may result from crushing injuries, burns, infections, and some types of poisoning. Occasionally, to save a life, surgeons must temporarily clamp off the kidneys during an operation.

In animal studies, mannitol at first appeared to affect the kidneys as it does the heart.

"Unfortunately, things are not that straightforward," said Donald R. DiBona, Ph.D., Chief of the MGH Laboratory of Renal Biophysics. "What we've found is that while blood flow in the kidney always returns to normal after a period of deprivation, without intervention the organ goes on to lose its primary function of clearing the circulation of toxins."

To explain these events, the investigators hypothesized that some areas of the kidney swell before others. Blood then detours through the unswollen regions. Plucking tissue samples from various areas, the researchers began putting them under the very high magnification of the electron microscope.

Their results yielded a knot thicker than the one they had set out to untie. During earlier animal studies they had inadvertently selected for detailed testing a single region which proved highly susceptible to swelling. Even without the use of mannitol, cells from the cortex, the kidney's major site for filtering toxins, showed no swelling at all. Yet mannitol was able to help the organ as a whole to regain function.

"We've been involved for the past two or three years," Dr. DiBona said, "in trying to unravel this mystery. We've done a number of experiments. Earlier we had always examined the kidney by clamping the renal [kidney] artery of the animal for an hour and then allowing flow to return for a period of thirty minutes. During that interval we would either add nothing, mannitol, or a sodium solution in a volume equal to that of the mannitol given other animals.

"We've decided to look at the kidney cells before releasing the clamp. Perhaps the cortex, the important region, is affected only during the period when there is no blood flow. Because in the previous studies we had waited for the flow to return, we were missing what happened."

Under the Program Project umbrella MGH physicians are also conducting lung investigations in several areas. Directing these studies is Dr. Homayoun Kazemi, Chief of the MGH Pulmonary Unit. Participating are Drs. Daniel C. Shannon, Barry W. Levine, Bernard J. Hoop, and Charles A. Hales.

With Dr. Hales, Dr. Kazemi has been investigating a change-in-lung-function problem which follows a heart attack (myocardial infarction). For a period of weeks after the attack, decreased oxygenation and diminished blood flow to the lower portion of the lungs were noted.

In addition, the MGH investigators have discovered that along with these difficulties small lung passages (airways) also close prematurely during breathing. Trapped, useless gases block the entry of oxygen-rich air. These findings together tend to support what physicians have long suspected: that fluid, built up in the lungs as a result of the heart weakness, lies at the root of the problem. The accumulation of fluid is thought to trigger the closing of the small airways and also cause the shift in blood flow away from the lung base toward the apex.

Another target of Program Project is the brain's chemical control of breathing. Recent studies in this area have focused on the degree of acidity of the cerebrospinal (brain and spinal cord) fluid and how the body regulates it.

The normal state for body fluids is a neutral one – between that of sour acids and bitter alkaline. Not quite neutral, however, the blood and spinal fluid tilt slightly toward alkaline.

If breathing becomes depressed, the lungs fail to rid the body of excess carbon dioxide (CO_2, a gas), and a condition called respiratory acidosis results. Excessive acidity of this type can cause death. A number of problems, including diseases such as pneumonia and emphysema, can depress

(Concluded on bottom of Page 7)

Miss Mary McGovern, chemistry laboratory technician, operates device (osmometer) to measure an index of the level of mannitol in blood used for a physiology experiment. This machine is also used to measure the same index in patients.

Inpatient Psychiatry

(Concluded from Page 5)

The new look on his service, Dr. Shershow believes, is symptomatic not only of a trend among general hospitals but also of a philosophic leaning among psychiatrists in general.

"In the past few years," said the Harvard Medical School Instructor in Psychiatry, "American psychiatry has moved closer to reidentifying itself with the mainstream of medicine. Increasingly the psychiatrist is coming to be seen less as someone isolated in a distant, specialized hospital and more as an adviser working side by side with other physicians in treating the patient."

Systemic Lupus Moves Into Clearer Focus

A veteran MGH physician is enlarging a hole in a curtain of mystery shrouding a potentially fatal ailment.

For more than 100 years, efforts of the medical world to treat lupus erythematosus, a connective tissue disease, have been thwarted by its erratic behavior – you can feel ill one day, fine the next – and the close similarity of its symptoms to other physical problems.

Some of the characteristics of arthritis develop in approximately 90 percent of the patients involved.

Fewer than a half-dozen books devoted exclusively to lupus can be found on medical library shelves, but another contribution is on the way.

Encompassing 43 years of study, the book by Dr. Marian W. Ropes, a member of the Arthritis Unit at the MGH, will present an analysis of 142 lupus cases and her experience with more than 200 others.

Entitled *Systemic Lupus Erythematosus,* the approximately 250-page book is scheduled for publication next spring by the Harvard University Press.

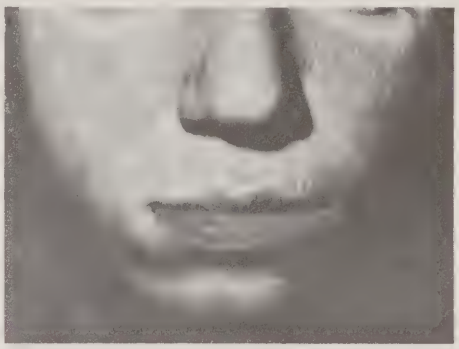
Lupus falls into two categories, discoid (chiefly skin) and systemic (entire body).

Dr. Ropes believes that the discoid type is a milder, more slowly progressive form. In most instances, it is limited to the skin and does not become a serious problem.

If uncontrolled, systemic lupus, on the other hand, can spread to any of the body's vital organs, such as the kidneys, lungs, heart, or brain, and can cause death.

It is reported that a half-million Americans have lupus; 50,000 more develop it each year; and 5,000 lives are lost annually because of it.

Dr. Ropes says, however, that over the past quarter century the increased awareness of lupus and the stepped-up efforts to control it, including use of many antibiotics, have paid off.



A rash shaped like a butterfly, a familiar sign of lupus

"Prior to 1950," she points out, "up to 80 percent of those who developed lupus died within the next three to five years. Today, the fatality rate is more in the order of 30 to 35 percent in 15 to 20 years. Some people have lived more than 50 years after coming down with the disease."

Eighty-five to ninety percent of lupus sufferers are women. Females aged 15 to 25 appear to be the most susceptible. But Dr. Ropes, an Associate Clinical Professor of Medicine, Emerita, at Harvard Medical School, is quick to emphasize that the condition has no age limit:

"Lupus can be found in children as young as 3 to 4 years and in adults as old as 75."

Dr. Ropes has no doubt that many people unknowingly have this disease. "What they have," she said, "is a very mild form which they pass off as perhaps some degree of arthritis or infection." And the condition may never worsen.

Lupus favors no particular climate or area of the country.

A study conducted in New York City indicated that lupus kills three times as many Blacks and Puerto Ricans as Whites. But Dr. Ropes thinks the figures might simply reflect the very heavy Black and Puerto Rican population in New York.

As an example, she explained:

"My experience at the Massachusetts General Hospital has been that a good number of Italians have been treated for lupus. However, this might just reflect the proximity to the MGH of Boston's North End with its predominantly Italian population."

The question of whether lupus is hereditary has never been answered. There have been instances of a parent and a child in the same family being treated for the disease, but worldwide the number has been relatively small.

What causes lupus? No one is certain, but one theory is that the culprit may be an infection, such as a virus, which somehow alters the body's immunity.

The symptoms include general weakness, joint pains, some fever, and a skin rash which, in three-quarters of the patients, takes on the shape of a butterfly across the cheeks and nose.

This unusual skin eruption can last for years or disappear in days, another indication of the illness' erratic behavior.

The infectious agent may lie dormant until triggered by fatigue, tension, or overlong exposure to the ultraviolet light rays of the sun.

Lupus patients need a great deal of rest. Emotional stress should be avoided to whatever extent possible. There should be adequate control of symptoms such as arthritis. Patients should always be protected from the sun by either clothing or sunscreens.

Tragically, in years past doctors sometimes mistook lupus for other problems having similar symptoms and prescribed inappropriate medications.

Drugs such as sulfonamides, used for urinary tract infections; hydralazine, used to control blood pressure; and the anticonvulsants, such as Dilantin, are among medicines for lupus patients to avoid.

Pharmaceuticals found beneficial in lupus treatments include the corticosteroids, such as prednisone, and the cytotoxic drugs, such as azathioprine, cyclophosphamide, and chlorambucil.

Dr. Ropes says that she personally emphasizes conservative treatment:

"In many milder cases, instead of the more toxic drugs, I simply prescribe aspirin."

Mannitol

(Concluded from Page 6)

breathing enough to bring on acidosis.

If the lungs unload too much CO_2, respiratory alkalosis (excess alkalinity) follows. This is a problem in certain diseases such as liver (hepatic) failure, and also in instances of lung disease in which breathing is increased because of lowered oxygen tension in the blood. Very commonly this condition results when anxiety or emotional difficulties cause a person to breathe extremely rapidly and deeply.

In addition to ongoing studies in chemical control of breathing, Dr. Kazemi is directing investigations of the nonrespiratory functions of the lungs and a disease caused by inhaling toxic levels of a metal dust called beryllium (April 1974, *MGH News*).

Also included in Program Project are two other major areas of research: basic cardiac biochemistry under Dr. Edgar Haber, and hormone effects on sodium and water transport across the cell membrane, under Dr. Geoffrey W. G. Sharp.

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Self-Care: An Important Part of Medicine

If you think do-it-yourself is a modern-day fancy, guess again.

The late Dr. Joseph Hersey Pratt thought of it 70 years ago.

This good doctor was ministering to MGH outpatients at a time when Massachusetts had 14,000 sufferers of tuberculosis. The state's death toll from the disease then ran as high as 5,000 annually.

Dr. Pratt pioneered the idea of gathering together tuberculosis victims to teach them how to put themselves back on the road to good health. His method exhibited such positive results that later he initiated group therapy for psychiatric disorders.

In the early days, a diagnosis of tuberculosis, then known as consumption, was a virtual death sentence for many poor people. Retreats where victims could recover were few and catered mainly to the affluent. The state had a sanatorium in Rutland, but even though the fee was low, it still was beyond the means of many.

Dr. Pratt reasoned that recovery from tuberculosis did not require one's presence in an institution, only strict adherence to the rules dictated there. And the rules could be followed at home. Essentially all that was required was absence from work for a period of months, sitting and sleeping out-of-doors (rain or shine), and following a strict diet.

Emmanuel Church on Newbury Street in Boston's Back Bay dipped into its funds to subsidize the program. The money went for tents, chairs, and extra wraps for the patients and toward compensating visiting nurses. Dr. Pratt and several colleagues donated their services.

Nine people comprised the initial tuberculosis therapy class, which met every Friday afternoon in the MGH outpatient clinic. After receiving a physical checkup, the patients would submit a notebook detailing how well during the previous week they had followed the regimen prescribed for them. Then they would be issued a new set of instructions.

At the end of the first 10 months, the doctors reported:

"All signs of active disease have diminished in nearly each one of the original nine members. In two cases, tubercle bacilli have disappeared from the sputum, and the disease is apparently arrested."

There was an average weight gain of 19.4 pounds. One member gained 40.5 pounds.

The departure from the norm in treating consumptives captured the imagination, and before long other classes sprang up in and around Boston. Dr. Pratt liked to call his method the "home sanatorium treatment." He said it bore about the same relationship to regular sanatorium treatment that a correspondence course does to a formal college education.

Today tuberculosis, except for the severely ill, is a condition treated almost entirely on an outpatient basis. But it can still be a serious, crippling disease and continues to beset a distressingly large number of young people. During 1973, the latest year for available statistics, the Massachusetts Department of Public Health recorded 680 new cases. There were twice as many males as females on the list.

Years passed before the sequel to Dr. Pratt's group therapy was written. While serving as physician-in-chief at the Boston Dispensary in 1930, he discovered that of 2,000 consecutive admissions to the clinic, no less than 36 percent were suffering from psychoneurosis. He promptly set up "thought control" sessions.

Scores of men and women suffering from mental tension attended the weekly meeting and found release from their pressures by talking over their problems with a trained leader and with others in the class. Group psychotherapy eventually was accepted all over the world as an effective way of coping with mental stress.

Acclaimed as a frontiersman of modern medicine, Dr. Pratt went on to play a leading role in the development of the New England Medical Center. The Pratt Diagnostic Hospital, a unit of the center, was named in honor of the one-time MGH physician who died in 1956 at age 83.

Three tuberculosis sufferers from the same family live on the roof of their home in early 1900s in line with recovery regimen prescribed by Dr. Joseph Pratt.

MGH News

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Immunity Control May Hinge on Rare Blood Cell

"Talking Out" Marital Problems Gets Results

A couple in their late twenties, unable to bear children, pursued adoption and were promised a little girl. About a month before the child was to arrive, the husband and wife became very depressed.

The wife no longer wished to continue the marriage, feeling unworthy because of her inability to conceive. Also, she was convinced her husband never really accepted her. She refused to speak to him except in angry outbursts and occasionally lashed out to strike him.

Dr. Gary Jacobson, Associate Psychiatrist at the MGH, cited this marital turmoil as an example of the problems brought to couple therapists today. The outcome:

The husband prevailed upon his wife to join him in obtaining couple therapy. It became apparent at the onset of the consultations that although adoption had been discussed at length, the wife had never really divulged to her husband her preoccupation with feelings of unworthiness.

During the therapy sessions, the wife unveiled a whole range of guilt emotions, some hidden since adolescence. Infertility seemed to her somehow a punishment. The husband spoke of how helpless and angry he felt at not being able to console his wife and regain her support.

There was frequent crying, but a great deal of sympathy was expressed by both, and their anger rapidly subsided.

The therapist could observe signs of previous strengths beginning to resurface. For the wife they first took the form of a vibrant sense of humor; for the husband an expression of confidence in his capacities as a potential father.

She wanted her daughter, said the wife, but she thought she might be jealous of the pretty intruder her mind had conjured up. She urged her husband, "Please be patient with me." They listened more carefully to each other.

After two months, therapy was terminated, and the adoption proceeded without incident.

In his own clinical experience, Dr. Jacobson, an Assistant Professor of Psychiatry at Harvard Medical School, stated that most, but by no means all, people emerge from couple therapy with a revitalization of their marriage.

"But when partners attending couple

(Continued on Page 2)

Drs. Ann and Harold Dvorak use a double-headed, light microscope to study a basophil slide.

While vacationing on Martha's Vineyard, MGH Associate Pathologist Harold F. Dvorak went walking in a bathing suit, got caught in a rainstorm, and picked up a "beautiful case of poison ivy." Itchy red lumps covered him from head to toe.

A few weeks later, the disease having run its course, he returned to his office and caught another "beautiful case of poison ivy," this time deliberately.

The doctor's seemingly bizarre action was aimed at furthering research on a very rare, very mysterious blood cell, called a "basophil."

Its granules contain potent substances (mediators) which apparently play a major role in the body's rejection of antigens (any invading foreign substances).

While evidence is at best circumstantial and preliminary, management of basophils might just spell the difference between success and failure in turning away tumors and viral infections and in winning the body's acceptance of skin, kidney, and heart transplants.

The human body reacts to antigens in the same way regardless of whether the alien matter is poison ivy or cancer.

Dr. Dvorak's investigation of the body's natural defenses required a model for study.

"After the Martha's Vineyard incident," he said, "I realized there was no more convenient ailment than poison ivy. You don't even have to insert a needle. Just a drop of poison-ivy extract on the skin, and you've got it."

After Dr. Dvorak purposely gave himself poison ivy, the reaction started in about six hours, reached a maximum

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EDITORIALS:

Not a Time to Get Careless

To some of us the 1955 polio epidemic seems all too recent. Thousands of families suffered from the ravages of the disease. Millions of others feared that the ailment would strike a loved one. Then when the Salk vaccine proved successful, the nation breathed more freely: Polio was "finished – wiped off the face of the continent." And so we thought. How wrong we were.

As a page 8 article notes, polio has become so rare that most young physicians have never seen a single case. But now comes the warning from public-health officials: Polio is not yet conquered. Lulled into false security, many parents have neglected to have their youngsters inoculated. As the numbers of unprotected children increase, so does the danger to the young.

To allow a once dreaded disease to rise again would be the most inexcusable kind of behavior. We owe more to our children. With millions of dollars being expended to prevent and cure unconquered diseases, we should not get careless about one for which medicine *has* found the answer.

Dulling Our Innate Curiosity

The page 5 article about research performed by medical-school students is a refreshing reminder of the fortunate fact that the young are often too uneducated to realize that their solutions to problems won't work. Since these solutions often *do* work, medicine proves to be the beneficiary.

Young people bring to the laboratory a curiosity that drives them forward. In fact small children undoubtedly retain much more innate inquisitiveness than postgraduate students. They have not yet had their curiosity partially stifled by adults.

Curiosity eradicated by adults? How so? Many times we have been too busy to answer the seemingly constant stream of questions posed by a child who begins by wondering why the sky is blue or leaves are green. A snappish response does more to dull Jack's curiosity than the most expensive schools do to whet it.

The human mind is one of nature's greatest marvels just waiting to be imprinted with all sorts of wondrous impressions. That many manage to dull this natural curiosity is one of life's great tragedies.

Seminar Talks Offer Valuable Instruction In Therapy Methods

(Continued from Page 1)

therapy *do* separate," he said, "they have a better chance to feel good about themselves as individuals.

"They're better able to give of themselves to their children. One can even notice a difference in how they treat other people. Even though their marriage dissolves, their own lives may improve.

"A great deal depends on how much development took place in the couple's relationship before the marriage crisis and what capacity each individual has for growth."

The well-trained couple therapist must be able to work with these factors. He must also recognize and treat any existing major psychiatric disorders such as manic-depressive disease, alcohol abuse, or sexual disability.

He must know how and when to step into an intense argument which may have occurred at home in much the same form literally hundreds of times.

"These can not only be stopped," Dr. Jacobson said, "but at times can also be converted into a dramatic pathway for each spouse to understand both himself and the other more productively."

Dr. Jacobson is Chairman of the Family and Couple Therapy Seminar, a program entering its fifth year at the MGH and at the Erich Lindemann Mental Health Center.

The seminar teaches couple and family therapy to all the specialties engaged in this effort, such as psychiatry, psychology, social service, and psychiatric nursing.

Each year, 30 to 40 students benefit from lectures, case supervision, and workshops presented by the MGH staff members and guests.

Although it may be an outcome, preventing divorce is not the primary focus of couple therapy. The primary goal is preventing "emotional divorce."

Emotional divorce, Dr. Jacobson stated, may precede legal divorce or separation by years or even decades. An emotional breakup "may take place

Photographs on pages 1, 3, 5, 6, and bottom of page 7 by Joel Salhanick

when the spouse no longer seems important for the other's vital life interests, or it may occur when the relationship is perceived as consistently damaging and without sufficient compensation."

The emotional breakup may be only partial. Certain tasks such as economic cooperation or raising children may go on reasonably well despite the partner's own need to seek psychological sustenance outside of the marriage.

Emotional divorce may also be chaotic, vindictive, and violent. Some studies indicate that under those circumstances children may be better off with parental separation.

In addition, too many children in a family can overwhelm a couple, splitting the family asunder by placing untenable pressures on the parents. For such reasons, Dr. Jacobson is a strong advocate of family planning.

Eight years ago he conducted a study among young couples and inquired how many planned to have no children. Less than one percent of the couples intended to remain childless.

That percentage is believed to have multiplied several times in the ensuing years. The reasons frequently offered by these couples are financial concerns, the instability of world events, and the population explosion.

However, in interviewing husbands and wives, Dr. Jacobson uncovers several other factors: severe doubts about the ability to raise children, a wish not to repeat painful childhood experiences of their own, and an unwillingness to risk a permanent commitment.

Dr. Jacobson is a staunch supporter of the no-fault divorce law concept which adds "irreconcilable differences" as grounds for divorce.

"Most people in Massachusetts who want to end their marriage," he said, "do so either by legal means or by simply walking away from it.

"The legal route in this state has most commonly been that of claiming 'cruel and abusive treatment' which requires that one spouse make such a case against the other.

"The psychological costs of this procedure can be heavy and can add to the bitterness and disappointment which one or the other spouse is already feeling. These proceedings can help distort such important postdivorce tasks as cooperation in the raising of children."

The MGH psychiatrist opposes suggestions that couple therapy be made a legal prerequisite to any divorce decision based on "irreconcilable differences."

"Most attorneys I have dealt with have been very conscientious about making the option of couple therapy known in a potential divorce situation," he commented. "Couple therapy should be available, but if required by law, it might become another sham procedure."

The psychiatrist feels that the couple therapist should be able to assess what impact social trends have on family life.

He cites several factors profoundly affecting the day-to-day quality of such living: the decline in the extended family (several generations living close to each other) taking place over the last three decades and, more recently, economic reversals, the emergence of a teen-age culture, and the women's movement.

From his viewpoint the overall effect of the women's movement of the 1970s has been very positive.

"A new sense of awareness as well as specific groups arising from this movement has helped women revitalize themselves within their family," he said. "In the case of divorce, these factors have helped to stabilize the postdivorce period and to avoid a rush into another unhappy marriage."

Dr. Jacobson gains perspective on the women's movement from his wife, who is a director of Continuum, a women's continuing-education program at Brandeis University. In addition to his other posts, Dr. Jacobson is Chief Consultant at Westwood Lodge Hospital.

On the subject of second marriages, he said:

"They are probably most controversial when the spouses are in their sixties or older. Remarriage at an older age can be satisfying for husband and wife. This is especially true if the marriage is seen by both as a relationship of its own and not a replacement for a previous union.

"Grown children whose mother or father has died sometimes find it difficult to see the remaining parent remarry. They often express it as, 'Is he being taken advantage of?' 'Do I have to call my mother's new husband, "Father"?' or 'Will I now be forgotten?'

"Some jealousy inevitably crops up. In a well-balanced family, however, the offspring are usually very aware that the parent's happiness may depend on not being lonely and on remaining actively involved in life."

Dr. Gary Jacobson, MGH psychiatrist, discusses merits of couple therapy in his office at the Erich Lindemann Mental Health Center.

Keeping a Marriage Healthy

Following rules does not guarantee success in marriage, but Anne W. Alonso, an MGH psychologist, has outlined guidelines that may help:

- Have faith and trust in one another. These are vital ingredients of true love.
- Develop some common ideals. But keep in mind that ideals, or goals, can change over the years.
- Try to maintain a sense of intimacy and vitality. Enjoying sex and keeping a sense of humor are important at any age.

(Concluded on Page 6)

Basophils' Rarity Makes Research Difficult

(Concluded from Page 1)

in two or three days, then slowly went away. Perhaps 15 "punch biopsies" were taken in that period for microscopic study of the skin tissue.

Working with Dr. Dvorak in the basophilic studies are his wife, Dr. Ann M. Dvorak; and Dr. Martin C. Mihm, Jr., Dr. M. Elizabeth H. Hammond, and Neil S. Orenstein, Ph.D., all of the MGH Department of Pathology.

The basophil is one of several forms of white cells in the blood.

Basophils are extremely rare: There are 600 red cells for every white one, and of the white cells only 1 in 100 is a basophil.

Viewed through a microscope, the cells can be seen in blood smears but not in routine tissue sections. Watery solutions are required to prepare tissue for study, and basophil granules are very soluble in water. Even when they show up, they may be mistaken for some other type of substance.

Since 1891, when Nobel Prize-winning scientist Paul Ehrlich of Germany recognized basophils and identified them as coming from bone marrow, they have been an enigma.

Studies to unveil their role have been limited greatly because they are so difficult to spot. Many believed they had no function.

In the past few years, however, interest has been stirred by findings which directly implicate basophils in the body's rejection of antigens.

After antigens invade the body, two types of reactions can take place, an "antibody alert" and a "delayed, cell-mediated, hypersensitivity response."

The antibody response ordinarily has very little to do with rejection of substances like tumors, transplants, or a variety of viral infections.

The resistance is believed to come from the other type of counteraction, which is initiated by sensitized lymphocytes, white cells born in the lymph glands.

There are lymphocytes sensitized to almost any antigen in the world. After these antigens strike, the lymphocytes rush to the invasion site, attracting at the same time a proliferation of basophils as a sort of army of shock troops.

An abundance of basophils has been found repeatedly in tissue grafts undergoing rejection by the body.

"What we want to do," said Dr. Dvorak, an Associate Professor of Pathology at Harvard Medical School, "is learn how to modulate the immune response so as to increase rejection in certain instances and suppress rejection in others.

"Before we can do anything in the way of management, however, we must better understand the makeup of basophils and how they function."

Working under grants from the National Institutes of Health and the American Cancer Society, the MGH research team has taken a major stride in this direction.

For a long time histamine has been known as one mediator present in basophils. Just recently, the MGH group discovered another, a trypsin-like protease, an enzyme that breaks up proteins.

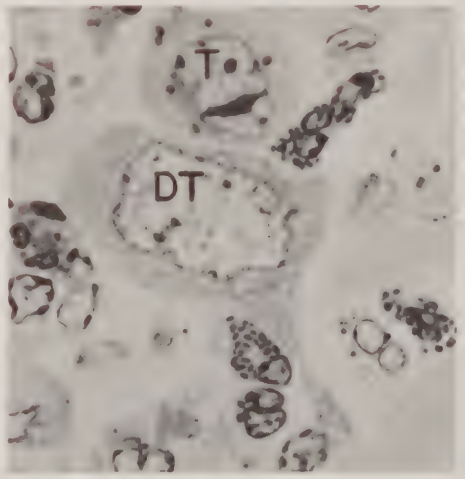
"There may be other things in basophils which nobody suspected," Dr. Dvorak remarked. "It's going to be interesting to see whether the contents of these granules are toxic to tumor cells, as they could well be."

What has made the intense studies possible has been discovery at the MGH of methods for demonstrating basophils in tissue sections and more recently of ways to isolate and purify basophils.

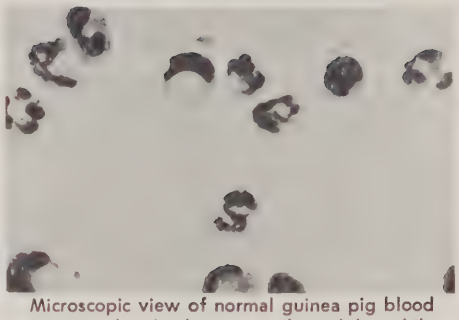
"You couldn't deal with them in whole blood," Dr. Dvorak said. "So we developed a scheme to purify the cells.

"The most important hurdle we overcame was getting guinea pigs to produce up to 200 times their normal level of basophils. Otherwise, we couldn't have done the job.

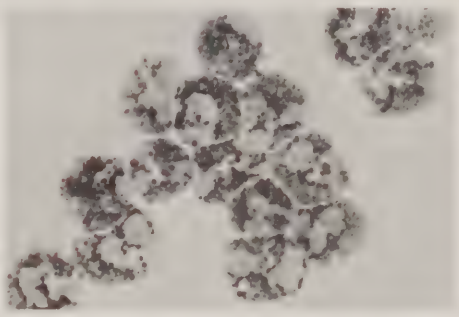
"We routinely get in the range of 50 to 75 percent pure cells. That's pure enough for our needs, although sometimes we go a little higher. People have come from all over the country to learn our method."



Dying tumor (DT) is surrounded by basophils, the dark granuled substances. Tumor (T) at top of photo is still active.



Microscopic view of normal guinea pig blood (upper photo) shows no basophils while same size sample of blood from guinea pig given special laboratory treatment (lower photo) contains only basophils.



Purification and a way to grow the cells have enabled the researchers to report two other previously unsuspected facts about what occurs during a reaction.

As the sensitized lymphocytes, accompanied by basophils, rush to the point of a bodily invasion, the clotting system is activated and local blood vessels undergo two remarkable changes. A proliferation of new blood vessels and a blocking of old ones develop at once. Whether these changes are related to basophils is still under investigation.

"We are trying to study the whole chain of events," Dr. Dvorak explained, "to understand how grafts and tumors are rejected.

"If we can say that 'A' leads to 'B' leads to 'C' leads to 'D,' then we can go about devising methods for blocking the chain. If you block a chain at any step, you've blocked the whole reaction."

Dr. Dvorak stressed that developing a blocking agent will involve a whole new area of research.

"A cure for at least some forms of cancer, a prevention of graft rejections – those certainly are our aims," the pathologist concluded. "But it's hard to offer a time scale. Although we're a lot closer to our goals than we were several years ago, there's still a very long way to go."

Advancing Research With Student Curiosity

The teacher's task is not to implant facts but to place the subject to be learned in front of the learner and, through sympathy, emotion, imagination, and patience, to awaken in the learner the restless drive for answers and insights which enlarge the personal life and give it meaning.

These words of former Harvard University President Nathan Pusey were spoken 16 years ago, but the concept has been a credo at the MGH since the early 1800s when it became the first teaching hospital of the Harvard Medical School.

Caring for the sick, teaching those responsible for that care, and conducting research into the causes, control, and cure of diseases are the precepts upon which the hospital has built its long tradition of serving mankind and the community.

To maintain that tradition, the curiosity and fresh outlook of the young mind are as indispensable to the MGH as the intellect and experience of the veteran on its medical staff.

Until a few years ago, more Harvard Medical School students engaged in research than did not. Today, student involvement is down to 10 percent.

Most medical students indicate that their overwhelming motivation for studying medicine is to deliver health care.

Dr. W. Gerald Austen, MGH Chief of Surgical Services and Professor of Surgery at Harvard, remarked:

"Research is certainly the cornerstone of progress in medicine and obviously essential for superb patient care and education.

"I personally feel that most students should have a little research time if only to understand what is involved and how difficult it is to move forward in new directions. Some students with strong investigatory interests, I think, should spend a very considerable time in research during their student days."

The young mind is quick to challenge long-held views. Dr. W. John Powell, Jr., an MGH cardiologist and Associate Professor of Medicine at Harvard Medical School, commented:

"When we try to teach first- and second-year students basic concepts in physiology, they question these concepts. They don't have the disadvantage of knowing dogma which should make their ideas 'impossible.' If the instructor keeps an open mind to the scientific criticism that these students provide, he is frequently exposed to exciting new ideas that challenge established concepts.

"This student inquisitiveness continues through the third and fourth years.

"I think it is extremely important for a teaching institution like the MGH to make research facilities and guidance available to students early in their careers. They then have the opportunity to become excited about research or, on the other hand, to find out that it isn't their cup of tea."

The value of student efforts in MGH laboratories has been demonstrated countless times. In addition to satisfying their appetites for knowledge, bright and eager young men and women often advance ideas that spur research into promising new directions.

Miss Phyllis Gardner, a senior at Harvard Medical School, adds nutrient to dish to maintain live cells until they are used for research in the Virology Laboratory of Dr. Richard O. Roblin III.

In the past four years, three students have made significant contributions in the Immunology Laboratory of the Infectious Disease Unit.

One helped to devise unique methods for linking penicillins to proteins. His studies, over three consecutive summers, enabled the laboratory to make antibodies to penicillins, thereby opening a new field of investigation in penicillin allergy.

These studies moved ahead this past summer when another student introduced new methods for separating antibodies from serums of humans and animals allergic to penicillin.

And during the last academic year, a Harvard student spent a four-month elective in the laboratory developing and refining a new test for "cell-mediated immunity." The work, now being continued by a Venezuelan, a Fellow in Infectious Disease, will be useful in the diagnosis of penicillin allergy and for studies of immunotherapy of infectious diseases.

Two years ago, a student in psychiatry won the coveted Boylston Prize at Harvard Medical School for an essay on work he did concerning the effects of hypnosis on pain. A student has also investigated how hypnosis affects smoking.

A large body of information has been derived from studies of the psychological aspects of being hospitalized in a coronary-care unit. And in the MGH Burn Unit, students have looked into possible ways of using relaxation techniques to reduce pain.

Dr. Powell directs the cardiac physiology laboratory of the MGH Cardiac Unit. Eleven Harvard students and ten clinical cardiac Fellows have been senior authors of research projects in that laboratory since it opened six years ago.

Dr. Powell told of important work carried out sequentially by four of his students to examine further the effects of digitalis, used to strengthen the contraction of the heart. Digitalis is one of the most frequently used drugs in medicine. The doctor said:

"The first student demonstrated five years ago through animal experiments that digitalis stimulates the nervous system to constrict blood vessels in skeletal muscles [those muscles attached to the skeleton].

"The next year, another student demonstrated that with the administration of digitalis the nervous system

(Concluded on Page 6)

Project Successes Spur Students Onward

(Concluded from Page 5)

constricts the arteries in the heart muscle.

"The year after that, student number three showed that digitalis appears to stimulate arteries both in skeletal muscles and the heart muscle through an action on the brain. Until then it had not been generally appreciated that digitalis entered the brain.

"Now a fourth student is continuing the investigation into the cardiac arrhythmic effects of digitalis and the potential use of nervous system-blocking drugs to reverse these arrhythmias [irregularities in heartbeats]."

All of the student projects completed to date in the cardiac physiology laboratory have been published in prestigious medical journals – *The Journal of Clinical Investigation, Circulation Research,* or *The American Journal of Physiology*. Each of these journals has a highly critical reviewing policy.

"Even more important," Dr. Powell said, "from just watching the progress of the students in the lab it is clear that they've been very excited by the projects which they've undertaken."

Of the cardiac Fellows who studied in Dr. Powell's laboratory in the past, one recently was named Chief of Cardiology at Johns Hopkins, another holds a similar position at Parkland Hospital at Southwestern Medical School, and a third is head of the coronary-care unit at St. Louis University Hospital.

Others have joined major teaching institutions and are engaged in both cardiac instruction and research. Several serve on the MGH staff.

Participants in the two-year cardiac fellowship program at the MGH have completed their internships plus one or two years as residents in internal medicine.

Dr. Kurt J. Isselbacher, Chief of the MGH Gastrointestinal Unit, believes a significant number of medical students have turned away from investigative work because of decreasing financial support, especially federal, for research and research fellowships.

It is fortunate, he believes, that there is still a reservoir of able and talented individuals. The Harvard Professor of Medicine commented:

"I have been impressed that the research which some students have carried out has been neither trivial nor insignificant but a major and substantive contribution. Frequently students have been the moving force behind a project."

Harvard medical students who undertake research customarily do so for a six-month period between the middle of their third year and the end of their fourth. But it is not a requirement.

Dr. David L. Rutlen, a first-year MGH Fellow in cardiology, thinks research should not be a mandate because if the student lacks motivation in this direction, he will not accomplish very much.

In early 1973, while a fourth-year Harvard Medical School student, Dr. Rutlen was honored by the Eastern Division of the American Federation for Clinical Research. The award was for MGH studies he conducted which supplied important new information on the physiologic function of the heart.

"It's always intellectually satisfying to be able to look at a basic problem and to get some understanding of it," Dr. Rutlen said. "It also tightens your thought processes to be able to tackle a problem in a very rigorous fashion."

Dr. Rutlen's goal is to do basic research, but in a setting where he can be involved in patient care.

"Even if I had decided not to go into research," he said, "my experience in the laboratory has been valuable because it has taught me to look very critically at information."

Ten to fifteen Harvard students engage in research studies at the MGH each year. They are spread out through the hospital's many departments.

At graduation Harvard bestows honors in special fields upon 10 to 20 medical students. In the past four years, honors have gone to 13 students who have trained at the MGH.

Working in Dr. Geoffrey W. G. Sharp's biochemistry laboratory, Ted Kohler, a Harvard Medical School senior, uses a "spectrophotometer" to measure the protein content of a liver homogenate.

Toward a Healthy Marriage

(Concluded from Page 3)

- Participate in carrying out family responsibilities. There can be real gratification if the sharing is done in a spirit of generosity.
- Be ready to compromise. Not all compromises may seem exactly fair, but they usually even out in the long run.
- Learn to live within your means. Most intense family battles are fought over money.
- Avoid putting all your hopes, dreams, and expectations in your children. By focusing unduly on them, you can unwittingly make your spouse seem insignificant.
- Respect your mate's development of special interests. And be ready to share those interests, if invited.
- Take a breather, and spend some time apart once in a while. It's important to feel that you are a competent individual who can enjoy being alone occasionally.
- Arguing is sometimes healthy to clear the air, but know when it's time to stop arguing or criticizing. A cooling-off period might lead to a more sensible solution later.
- Compliment your spouse when praise is deserved. Let him or her know of your appreciation.

Apathy Could Cause New Polio Outbreaks

(Concluded from Page 8)

tional Foundation for Infantile Paralysis [now called the National Foundation], and they'd tell us where we could pick up another iron lung. But we always tried to keep a spare on hand anyway.

"At times the iron lung could not provide enough air pressure for the patient. Fortunately, although designed for use in anesthesia, the Jefferson ventilators were able to fulfill the patient's need.

"Later in the treatment program patients were moved to rocking beds, or they donned portable chest respirators.

"The beds actually rocked to help move the diaphragm up and down. The respirators achieved the same effect by means of suction on the chest."

With the advent in late 1955 of the vaccine developed by Dr. Jonas E. Salk, then of the University of Pittsburgh, and later the oral vaccine of Dr. Albert B. Sabin, then of the University of Cincinnati, the incidence of polio plummeted.

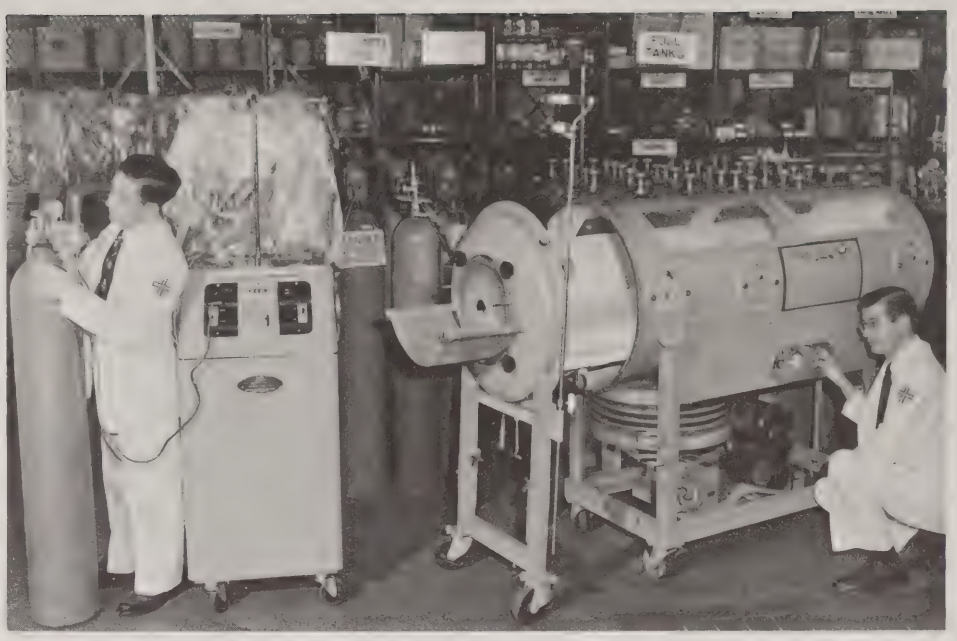
Financed by March of Dimes contributions, campaigns to immunize children were implemented throughout the country, and the rate of paralytic polio promptly toppled from 13,850 cases in 1955 to 7,911 in 1956, to 2,499 in 1957, and on down.

As the epidemic subsided, the ventilation ward on White 9 was phased out. But the experience gained was gradually returned to use in caring for patients with paralysis or respiratory difficulties stemming from conditions other than polio, such as myasthenia gravis, polyneuritis, crushed chests, and overdose of drugs.

As these patients grew more numerous, the MGH established its Respiratory Unit in 1961. Delivering air pressure to the lung through the trachea is now standard procedure in the mechanical ventilation of patients.

Is poliomyelitis now to be written off? Not by a long shot. Complacency has set in. During the past year, the Massachusetts Division of Communicable Diseases conducted a survey of 88,439 children entering kindergarten in 1,461 schools. The findings: 7,032 youngsters had not been inoculated against polio.

Continued freedom from the disease demands regular immunization of all children from early infancy. The least protection exists principally in disadvantaged urban and rural groups. Most cases of paralytic polio in recent years occurred in these populations.



Angelo Guarino, left, and the late Edmund Banks, right, MGH respiratory therapy technicians, check readiness of oxygen equipment and iron lung during 1955 polio epidemic.

In Massachusetts the law requires that before a child is admitted to school he must be protected against diphtheria, tetanus, whooping cough, measles, and polio, unless he has received special exemption.

The Salk and Sabin vaccines are of no benefit to an individual already stricken with polio.

In an unprotected person the virus infiltrates the body through the nose or mouth, travels to the intestines, and moves along nerve fibers or the bloodstream to the central nervous system. The virus then enters a nerve cell and multiplies so rapidly that the cell is either severely damaged or destroyed. When many cells are so affected, paralysis strikes leg, arm, or trunk muscles.

In the 1955 epidemic, some patients, confined to iron lungs, remained at the MGH for many months. Some survivors to this day must return to the hospital periodically for respiratory treatment of residual problems.

The vaccines contain polio viruses which have been rendered harmless but which are capable of stimulating the production of antibodies in the human system.

This protection is available in Massachusetts from public-health authorities without charge.

High-volume respirator like the Bennett M.A.-1 shown by Hermann Hansen, respiratory therapy technician, would replace cumbersome iron lung for polio patients today.

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Remembering a Time of Crisis in Medicine

From 28,985 cases to only 5 . . .

Twenty years ago, a polio virus spread through the United States forcing hospitals everywhere to invoke emergency programs for patient care.

Of the nearly 29,000 cases reported nationwide in 1955, 13,850 involved paralysis. Massachusetts alone counted 175 deaths from the disease, which is associated with a degeneration of cells in the central nervous system.

Today, thanks to vaccines which stimulate the body's defenses, poliomyelitis has been transformed from a national scourge to an easily preventable affliction.

Since the beginning of 1975, only five new cases have been reported in this country. Not even a single new instance of the infection has appeared in Massachusetts since 1969.

When the 1955 epidemic struck, the MGH was fortunate to have on its staff a number of physicians who had experienced polio outbreaks in Scandinavia in 1952 and in Britain the following year.

When the patient's breathing muscles were paralyzed, the immediate remedy was to put him in an iron lung, a cylindrical chamber in which air pressure forces the chest to expand and contract, thereby aiding the natural lung.

Dr. Henning Pontoppidan, now Chief of the MGH Respiratory Unit and Respiratory Care Department, was an intern in a county hospital in Denmark in 1952:

"I spent several months of my internship sitting with medical students and others, manually breathing patients [applying artificial respiration] because there weren't enough mechanical respirators to go around. We worked in four-hour shifts, and, I can tell you, as the months wore on and the crew began to become both physically and emotionally exhausted, we welcomed the arrival of mechanical breathing devices."

During the early phase of that epidemic, when iron lungs were used, the fatality rate among those needing respiratory assistance approximated 90 percent. Later, with manual and mechanical respiration plus chest physical therapy and ways to protect the lungs from pneumonia, the death rate fell to less than 50 percent.

By 1955, when the MGH was deluged with polio patients, those physicians who had been through the European crises were ready.

Although the MGH responded initially with the classic use of iron lungs, techniques used in anesthesiology proved of value in the management effort. Dr. Pontoppidan explained:

"Dr. Henry K. Beecher, then Chief of Anesthesia, had a ventilator which he used in the operating rooms for patients undergoing surgery. Many of the polio patients had undergone tracheotomies [the making of a hole in the windpipe] and, using Dr. Beecher's equipment, it was possible to deliver air pressure directly into a lung through a tube in the trachea. It wasn't long before additional such equipment and humidifying apparatus came onto the scene.

"Meantime, because of a steady stream of patients with paralytic polio, the hospital centralized the treatment program by setting up a special respiratory ward on the ninth floor of the White Building.

"Special credit must go to three respiratory therapy technicians, Al [Angelo] Guarino, Hermann Hansen, and the late Edmund Banks. They had a great impact on patient care and survival during that epidemic."

Guarino and Hansen are still on the job. Guarino recalled that during the polio crisis "we had 45 iron lungs and 6 Jefferson ventilators [the type used by Dr. Beecher] operating at the same time.

"When we knew a patient was coming in," he said, "we'd call the Na-

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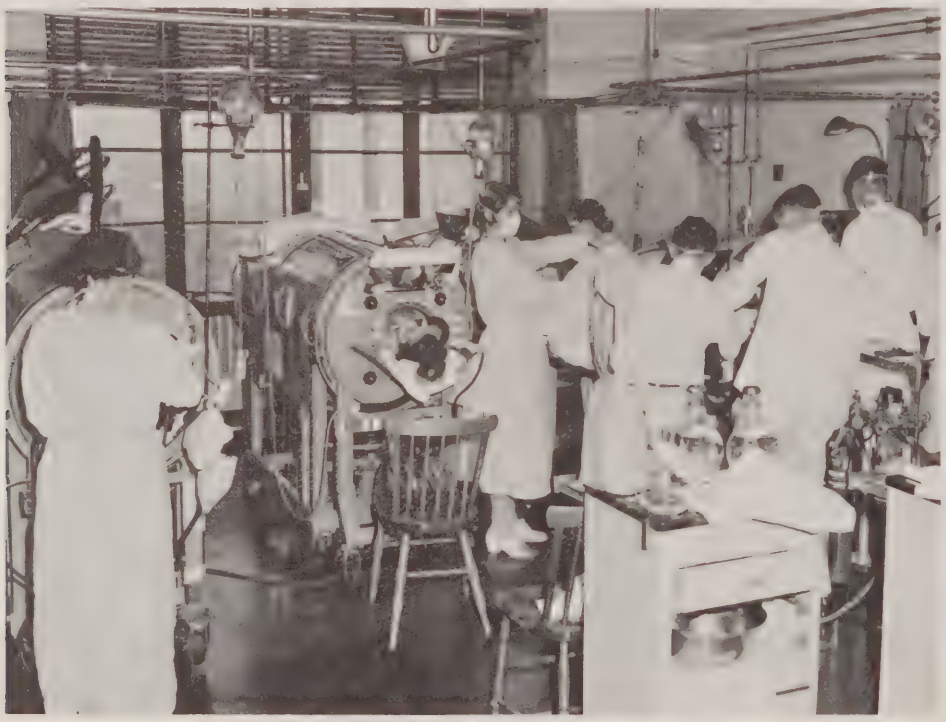

Nurses and technicians providing iron-lung respiratory care to paralyzed patients in a special ward at the MGH during the 1955 polio epidemic

MGH News

Vol. 35 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS January-February, 1976

Blend of Skills Conquers Eye Tumor in Newborn

INFECTION CONTROL

Assuring a Proper Setting for Patient Care

Place hundreds of seriously ill people in a single institution. Use the same X-ray equipment and other devices to diagnose and treat their problems. Assign one person to care for several individuals. Feed the entire population from a central kitchen. Add numerous auxiliary services and thousands of visitors.

What do you have?

A modern hospital with all the life-saving advantages it provides for the critically ill. But since everyone harbors bacteria, grouping people, whether in a theater, crowded streetcar, or hospital, increases the chance of germs circulating.

Long aware of this, hospitals wage a continuing battle in hundreds of ways to assure safe surroundings. As a result, at the MGH and other major medical centers, in spite of large numbers of very sick patients and the greatest potential for trouble, the incidence of the spread of infection among patients remains small.

Until the 1950s infection control was mainly the responsibility of individual wards and specialty services. Then, aware of medicine's growing complexity and the increasing use of common services by patients, physicians agreed they needed much more than a fragmented approach.

In 1956, the MGH set up a control committee composed of representatives from all key departments. The American Medical Association and the American Hospital Association later paved the way for adoption of the same concept in all hospitals in the country.

In establishing their committees, many institutions turned to the MGH for guidelines.

Dr. John F. Burke, a surgeon internationally known for his expertise in infection control, has been chairman of the MGH panel since 1959.

"The committee," he said, "deals with every aspect of the hospital's function, from the maintenance department to the surgical service. Our fundamental duties are to identify and terminate outbreaks of infection, investigate the causes, and develop a plan to prevent them from recurring.

"Our mandate is also to provide educational programs for the hospital community on techniques of infection control."

(Continued on Page 4)

His ailing right eye protected by a makeshift covering, Jason Mulderig rests in MGH Newborn Intensive Care Unit pending surgery.

When Suzanne Mulderig entered Webber Hospital in Biddeford, Me., to give birth to her second child, she had no reason to sense impending complications.

"I was perfectly healthy throughout my pregnancy," she said. "I wasn't sick at all. In fact I was able to continue working at my job as a bookkeeper and office manager until two weeks before the baby was due."

The arrival of Jason Michael Mulderig on November 5, 1975, however, turned out to be anything but a routine event.

A full-term infant weighing 6 pounds, 5 ounces, he was physically well in all respects but one. Over the next 10 days that exception required the skills of an array of specialists at the MGH and the Massachusetts Eye and Ear Infirmary (MEEI).

Jason was born with a tumor behind his right eye – a tumor larger than a lemon.

Diagnostic tests would later verify the abnormality as a teratoma, a developmental tumor formed before birth from two or more types of misplaced tissue. The growth led to severe proptosis (forward protrusion of the eyeball from its socket).

Medical literature records fewer than 50 such cases in the world, and in only 2 or 3 of these has surgical treatment succeeded in saving the eye while removing the tumor.

Since Mrs. Mulderig had elected to have her baby by natural childbirth, she was at once aware of her son's misfortune and also of the steps being taken by her obstetrician, Dr. William Buell.

(Continued on Page 2)

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Saving Money by Working Together

"Hospitals waste millions of dollars because they fail to plan as a group." That statement is virtually a battle cry of health-care critics. In fact there is some truth to this charge. Not every institution should perform open-heart surgery. Indeed the success rate falls off considerably unless the surgeons maintain their highly technical skills by carrying out such procedures frequently. Although this surgery is a common example, other techniques and equipment could also be cited.

Alternatively hospitals have done much to regionalize at least some activities. One obvious instance is the Affiliated Hospital, the planned yoking of three Harvard Medical School teaching institutions into a close family. Progress toward that goal has been understandably slow, yet fulfillment seems close. Examples abound in which hospitals pool services, such as laundry, to save money.

There is one case, however, of two autonomous hospitals which since 1928 have worked so closely together to achieve major economies that many people think they are one and the same institution. We are referring to the Massachusetts General Hospital and its neighbor, the Massachusetts Eye and Ear Infirmary. Until growing pains recently led the MEEI to build a new structure, the Infirmary has conducted its eye, ear, nose, throat, and attendant specialties clinics in the MGH Clinics and connecting Building. Many MEEI physicians hold a consulting appointment at the MGH. Conversely, many MGH physicians have similar professional privileges at the MEEI. In this way the MGH has avoided recruiting eye, ear, nose, and throat specialists, and the MEEI has been able to restrict its own staff to those four specialties. How does this relationship work? When the MEEI admits a patient with a nose problem, for instance, he may need attention for a secondary condition such as diabetes. A telephone call can produce an MGH diabetes expert to consult with. Or if an MGH patient with heart disease requires attention for a secondary problem like an ear blockage, an MEEI consultant stands ready, but a building or two away. No one has ever calculated the many millions of dollars that this close cooperation has saved both institutions over the years in personnel, in office space, and equipment.

A front-page article in this issue epitomizes this relationship. Physicians and a large supporting team from both hospitals shared expensive equipment, advice, diagnostic and patient-care skills – even an operating room – to save a newborn from a rare condition. What makes this boy's cooperative care so different is that his eye problem brought him to the MGH instead of the MEEI. Major reasons were the availability of the MGH's Newborn Intensive Care Unit which provides expertise in caring for very sick infants and of specialized MGH anesthetists who devote all their skills to children.

Thus both institutions played major roles in making the baby healthy. The interplay of man and machine from each hospital markedly enhanced the tiny patient's chances. Cooperation like this between neighbors occurs each day and has for some fifty years.

Highly Sophisticated Devices Are Used in Testing Maine Baby

(Continued from Page 1)

"He put in a call right away to Dr. James Swarr, an eye surgeon who was in the hospital," the 28-year-old mother remarked. "Dr. Swarr was operating at the time, but he relayed instructions on what kind of medication to apply until he could look at the baby.

"As soon as the doctor came down and examined Jason, he told us he had never seen anything like this and that Jason should be sent to Boston without delay."

Dr. Buell and a pediatrician whom he had called in, Dr. Lyman A. Page, concurred with Dr. Swarr's opinion that the infant needed the immediate assistance of top specialists supported by sophisticated diagnostic and treatment facilities.

Dr. Swarr contacted Dr. David S. Walton, Director of Pediatric Ophthalmology at the MEEI and Assistant in Pediatrics at the MGH.

Protected in an isolette (a type of incubator), Jason was wheeled into an ambulance and motored the 100 miles to Boston. Mrs. Mary McVicar, RN, a staff nurse at the Webber Hospital and personal friend of the Mulderigs, carefully attended him.

Suzanne's husband, Stephen, a 31-year-old grocery manager, and her father drove behind the ambulance.

Seven hours after his birth, the infant was in the Newborn Intensive Care Unit of the MGH.

Participating in the diagnostic evaluation that followed were specialists from both the MGH and the neighboring MEEI. The two are affiliated but separate institutions, which work closely together to avoid duplication of services.

X rays taken in the Infirmary's radiology department and interpreted by Dr. Alfred L. Weber showed that the socket (bony orbit) of the right eye was generally enlarged and that the tissue possessed abnormalities suggestive of a teratoma.

Ultrasonographic (ultrahigh fre-

Photographs: Page 1, Dr. David S. Walton; p. 3 (upper) Mary M. Hoffmann, (lower) courtesy of Massachusetts Eye and Ear Infirmary; pp. 4, 5, 7 (upper), 8, Joel Salhanick; p. 6, courtesy of Shriners Burns Institute; p. 7 (lower) MGH Photo Lab.

quency sound-wave) studies were then conducted at the Infirmary by Dr. Richard L. Dallow, Director of the MEEI Ultrasound Laboratory. By this method, one can detect the presence of an inflammatory disease, foreign bodies, the formation of a tumor, and many other conditions.

The test confirmed that the mass within the orbit was a tumor and disclosed that it was saclike (cystic) in nature. The outlook was death within a year unless the tumor were removed.

Dr. Dallow has examined with ultrasonography more than 800 patients with forward protrusion of an eye. He described Jason's tumor as the largest abnormality of its kind he had ever seen or heard of in an infant.

To make certain that the tumor had not originated from, or extended into, the brain cavity on the right side of the head, a scanner (known both as computed tomography [C.T.] and the EMI scanner) (*MGH News,* September 1974) was brought into use by Dr. Kenneth R. Davis, an MGH Assistant Radiologist.

Employing a relatively new technique, the scanner can define the nature of soft brain tissue on various horizontal planes in the head. X rays examine "slices" of tissue from 180 different angles and also pass through each spot in the slice 180 times. Information picked up by very sensitive detectors is then fed into a computer for analysis.

The test for Jason corroborated the earlier findings that a cystic mass behind his right eye was pushing the eye forward and that the growth was confined to the socket area.

Together the ultrasound examination and the C.T. scan thus provided information on the size and nature of the lesion as well as its location in relation

Miss Judith Platt, RN, holds Jason Mulderig in Newborn Intensive Care Unit following removal of his rare eye tumor.

to other tissue behind the eye, such as the optic nerve and muscles.

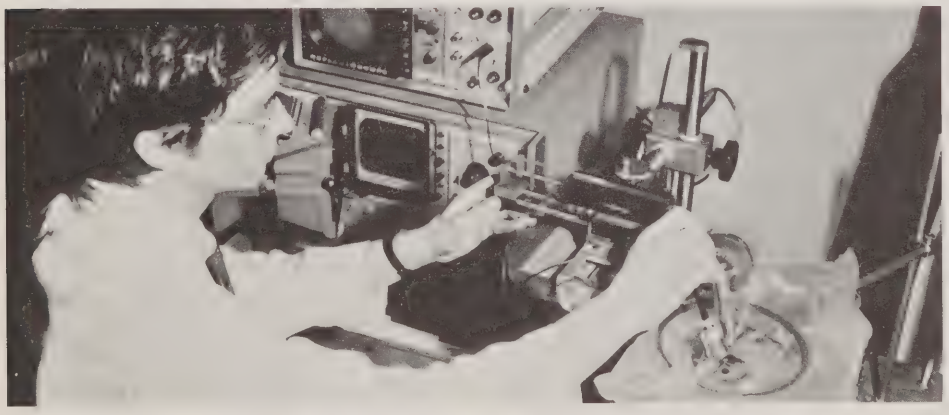
"The ultrasound and C.T. scan techniques," Dr. Dallow said, "have revolutionized the diagnosis of tumors such as these. In combination, the two devices provide much more information than we could ever obtain from other sources.

"We're given a very good idea of what is going on. The combination is not available anywhere else in New England. In fact it is present in only a few hospitals in the country."

Using the data these two techniques provided, Dr. Walton was able to chart a detailed surgical approach to Jason's problem.

During the several days required for Jason's extensive evaluation, his mother often held and fed him in the MGH Newborn Intensive Care Unit, and the child received meticulous attention to his exposed right eye from the nurses.

A soft contact lens helped to protect the cornea, and the nurses further treated it with various protective drops at frequent intervals.



Presence of tumor behind Jason Mulderig's right eye was confirmed by ultrasonographic device being used here on another patient by Dr. Richard L. Dallow of the Massachusetts Eye and Ear Infirmary.

On Jason's seventh day of hospitalization, his incubator was wheeled into one of the MGH pediatric operating rooms.

The baby's anesthesia was determined and administered by Dr. John N. Ditton, an MGH specialist in pediatric anesthesia, and Dr. Philip W. Lebowitz, an MGH resident in anesthesia.

Dr. Walton removed the tumor, assisted by Dr. Arthur S. Grove, an Assistant in Ophthalmology at the MEEI. They achieved its removal in about 90 minutes without complications or evident injury to the eye structures.

Jason's postoperative course went smoothly. During the lifesaving operation, his right eye had returned "nicely" to its proper (socket) position, and on November 15, three days later, he was taken home by his parents to join his 5-year-old brother, Craig.

Has the operation saved Jason's eye?

"He can perceive light," Dr. Walton stated. "I am hopeful that his eye will see normally, but it's much too early to know for certain. We will keep a close watch on the condition of the optic nerve and cornea. The left eye is entirely normal."

During return checkups since the MGH stay, Dr. Walton has found Jason's right eye to be progressing satisfactorily. Its preoperative exposure, while out of normal position, resulted in an excessive accumulation of fluid in the tissue spaces (corneal edema), but this is expected to continue to improve.

An Assistant Professor of Ophthalmology at Harvard Medical School, Dr. Walton praised the dedication and work of the MGH and MEEI personnel who assisted in Jason's evaluation and care.

"Many of the specialists I called to help this child had extremely tight working schedules," he said, "but they still made the time to carefully evaluate him and assist with his treatment.

"All the nurses who tended Jason in the Newborn Intensive Care Unit were just tremendous. They diligently ministered to him and also helped his parents very much. The parents felt the nurses' attention to their son added an important dimension to his care.

"The combination of the variety of expertise of many different people, their devotion, and the availability of unusual diagnostic techniques enabled us to overcome the challenge of Jason's rare problem."

Controlling Infection Entails Three Areas Of Special Attention

(Continued from Page 1)

Associated with the committee in the investigative and educational work are the hospital's epidemiologist, Dr. Cyrus C. Hopkins, and two nurse specialists, Mrs. Carole M. DeMille, RN, and Mrs. Marie M. Kelleher, RN. Edward H. Tateosian, Environmental Control Officer, is responsible for infection control in the hospital's physical plant.

The problems of control vary.

"There are three kinds of issues we deal with," Dr. Hopkins said. "One is the patient who comes in with a communicable disease, such as hepatitis, which can be transmitted to other patients or the staff."

In this situation, the characteristics of the organism determine the methods to be employed to prevent its spread.

The hospital has drawn up a special manual which specifies, for example, whether the disease requires isolation of the patient in a private room, whether the staff must wear gowns, gloves, or masks during contact with the patient, and what steps must be followed to decontaminate such items as linens and eating utensils.

"A second problem category," said Dr. Hopkins, "involves certain hospital procedures which, though essential for care, may be a cause for concern in terms of transmitting infection.

"There are risks attached to such techniques as mechanical respiration, the administration of fluids intravenously [via tubes inserted into a vein], and the use of urinary catheters [tubes for urinary drainage]."

While on a respirator, a patient breathes air which is humidified by coming in contact with a pool of still water. If allowed to stand for long periods, this pool might become contaminated with bacteria.

Intravenous lines and catheters pose potential problems because they bypass the patient's skin, which forms his outer defense against infection.

The hospital assigns special teams to prepare respirators and catheters, and strict rules govern the handling of intravenous lines.

"A third problem," Dr. Hopkins continued, "is that of keeping to a minimum cross-contamination with organisms that are not ordinarily pathogenic [disease causing] and which all of us carry on our skin or in our gastrointestinal tracts."

Cross-contamination of this type is of major concern because a broad variety of bacterial infections falls into this category.

One of the most serious complications in a hospital is the occasional appearance of bacteremia (presence of bacteria in the patient's blood). Should an MGH patient contract this condition, a special investigation would be launched to learn the circumstances.

Dr. Hopkins, Mrs. DeMille, and Mrs. Kelleher receive from the Bacteriology Laboratory daily reports of any positive blood cultures – evidence of probable bacteremia. From these records they can identify the location of an infection problem and discern patterns to pinpoint any possible common source of contamination.

If a patient should become infected, the team also checks with his floor to make certain that all proper precautions are being observed.

Mrs. Marie M. Kelleher, RN, an infection control nurse, and Dr. Cyrus C. Hopkins, MGH epidemiologist, regularly check an early-warning system to guard against the spread of organisms in the 1,084-bed hospital.

Mrs. Roberta Keene, RN, charge nurse in the Respiratory Intensive Care Unit, emerges from isolation room where treatment of patient requires wearing special clothing to avoid spread of infection.

Similar monitoring is conducted to detect the frequency and distribution of other conditions, such as wound and urinary-tract infections.

Since ordinarily harmless organisms which live nearly everywhere on earth can endanger a person weakened by illness, the hospital constantly scours its environment for them. The MGH Building Service Department, for example, trains employees in special techniques for washing floors, walls, and furnishings to reduce the number of bacteria present.

In operating rooms where open wounds leave a patient highly susceptible to infection, restrictions are routine. Equipment must be sterilized, and those entering the surgical areas must wear special clothing and masks.

The victim of serious burns is probably the highest infection risk in medicine and requires intensive precautions to protect him. Debilitated, fed through a tube inserted into a blood vessel (hyperalimentation), and devoid of large areas of protective skin, he offers little resistance to bacteria.

The burn patient can easily succumb to infection from normally harmless bacteria which inhabit his own gastrointestinal tract. Drugs to hinder these organisms sometimes prove ineffective.

"It's been the experience everywhere," said Dr. Hopkins, an Assistant Professor of Medicine at Harvard Medical School, "that the more a hospital uses a drug the more likely is the appearance of organisms resistant to it."

Once a resistant strain develops in a hospital the organism may survive even the most concerted efforts to eradicate it.

In addition to coping directly with such infection challenges, the MGH control team educates other personnel in the hospital on ways to help. The teaching efforts range from seminars and lectures to informal day-to-day contacts.

Hospitals throughout the world send nurses to the MGH to have them gain further insights into infection control. Mrs. DeMille is president of the Association for Practitioners in Infection Control, a 1,900-member international organization.

Despite extensive studies over many years, gaping holes still exist in medicine's understanding of bacterial infection. How some organisms travel from one person to another, for instance, remains unclear, and as the hospital environment becomes more complex, new routes may still evolve.

Ironically, medical advances can also be accompanied by new concerns. Thus when drugs (immunosuppressives) are administered to prevent rejection of a transplant, they also impair the patient's ability to resist infection.

With demands mounting for hospitals to economize, Dr. Burke, Infection Control Committee Chairman, believes there will have to be a more intensive use of staff and facilities and, as a consequence, greater risks of cross-infection.

Dr. Burke suggested that to provide better protection for the patient without raising costs astronomically, hospitals may have to reorganize along the lines of susceptibility to infection.

To the extent possible, highly vulnerable patients might be housed in individual units with environments designed to exclude virtually all potentially harmful organisms.

At the other end of the spectrum, a patient with little chance of becoming infected might occupy a ward under today's usual routine. Even these kinds of reorganizations might often be impractical because they would necessitate costly, major rebuilding programs.

Though such changes may be required to meet the challenges of the future, Dr. Burke, who is Professor of Surgery at Harvard Medical School, feels most hospitals are handling infection control well.

"Ideally," he said, "we should like to eliminate cross-infection. Realistically, no hospital can achieve this, but it is fortunate that so many institutions do a good job of keeping the risk low."

A routine day for Mrs. Carole M. DeMille, RN, infection control nurse: (upper photo) discussing posted precautions for patient with Miss Jan Flaherty, RN, Respiratory Intensive Care Unit teacher (at left); (center photo) meeting with Miss Deborah Morgan, bacteriologist in the laboratory of Lawrence J. Kunz, Ph.D., to learn of any positive blood cultures which could indicate presence of bacteria; (lower photo) conferring with Miss Kathleen Sweeney, unit coordinator on Baker 3, a neurosurgical unit, to note infection susceptibility of any new patients.

Depression in Parents Can Affect Children

Periods of feeling sad, blue, discouraged, and empty are part of the normal human existence. As many as one of every four adults, however, at some time in their lives, slip beyond normal mood shifts to depressions of abnormal duration, intensity, or quality.

To make matters worse, the lives of children frequently are deeply affected by a parent's depressed state.

This problem was discussed at an MGH medical meeting (Children's Service Grand Rounds) by two staff psychiatrists, Drs. Gerald L. Klerman, who is also Superintendent of the Erich Lindemann Mental Health Center, and Norman R. Bernstein, Acting Director of Child Psychiatry at the MGH.

"Depressed men and women usually make poor parents," said Dr. Klerman, "not as impaired as schizophrenic or alcoholic parents, but impaired enough. Depression is the most common psychiatric condition of adulthood, and it is diagnosed in women three times as frequently as in men.

"The offspring of depressed women are at greater risk for a whole plethora of psychiatric disorders. The type seems to vary with age. The disorders range from school difficulties before puberty to drug abuse, sexual deviation, and so-called 'acting-out' in the mid-adolescence phase."

Dr. Klerman, a Professor of Psychiatry at Harvard Medical School, said depressed mothers have at least four impairments in their maternal role:

(1) They cannot demonstrate adequately their warmth and love to their children. (2) Overall they communicate less verbally and nonverbally with their young ones. (3) They are less able to reinforce the positive normal growth experiences of their offspring. (4) They are often openly hostile and aggressive toward their children.

Youngsters do not become depressed in the same manner as adults, according to Dr. Bernstein, Chief of Psychiatry at the Shriners Burns Institute and an Assistant Professor of Psychiatry at Harvard Medical School.

The depressed adult, he said, often goes around devaluing or even hating himself, and in many ways holding in his hostility. Children living with their parents are much less in a position to do this. Their dependency on and relationship to the people around them operate against this kind of firm internalization.

"The child's facility for withdrawal," Dr. Bernstein stated, "enables him in many ways to avoid the pain of the depression by going back to something more primitive, such as weeping, curling up, and performing in a more basic way, which detours some of the emotion of sadness."

Studies conducted some years ago by Boston's Judge Baker Guidance Clinic showed that youngsters from deprived homes had committed delinquent acts as an alternative to depression. When the children began to feel overwhelmed, they struck out, breaking a window, stealing something, or becoming otherwise involved in a wrongful act.

"Certainly, the epidemic of divorce we all deal with," Dr. Bernstein told his colleagues, "produces many children who get involved in delinquent behavior as an alternative to depression."

The incidence of severe depression (depressive psychosis) in the young is very difficult to determine. One reason may be the extent of debate over what constitutes depression in a child. Many professionals contend real depression does not occur in youngsters.

Dr. Bernstein spoke of one child-psychiatry textbook which doesn't even have the word "depression" in the index, much less in the text. He added:

"I think we very rarely treat a child for the diagnosis of depression, per se, although we see many children who are depressed."

Dr. Klerman emphasized that depression in the adult includes groups of symptoms which do not begin in the patient's mind. He said:

"Many depressed patients who have gone from gynecologist to internist to orthopedist only to be told their complaints are all in their mind are being done a major disservice."

He stressed that these patients are not imagining the bodily changes that are taking place, such as weight loss, insomnia, difficulty with bowels, palpitations, and sweating.

He told the medical group, assembled for what is known as "Pediatric Total Patient Care Grand Rounds":

"Just as medical diagnosticians are used to thinking of anemia as being secondary to some other problem, such as infection, so should they think of some depressions in adulthood as being secondary to or associated with some other condition."

General bodily (systemic) disorders which appear to be linked with depression include blood vessel (vascular) diseases of the brain, endocrine (glandular) disorders, viral infections, and certain tumors.

A St. Louis study involving a large number of patients indicated that about three-fifths of all depressions are associated with one or another kind of systemic disorder.

Wrongful acts committed by children as an alternative to depression can sometimes result in self-injury.

Most Epileptics Still Lack Acceptance as Equals in Society

Have you ever gone to bed at night and suddenly felt the twitch of one leg just as you were about to fall asleep? Most people have. That's a close relative of a seizure, the same phenomenon that epileptics experience.

Yet, since the dawn of history the word "epilepsy" has frightened people. Victims of the disease have been ostracized by society or, at the very least, accorded the status of second-class citizens.

Recent studies by the American Epilepsy Society show that epileptics remain virtually the last individuals that companies will hire.

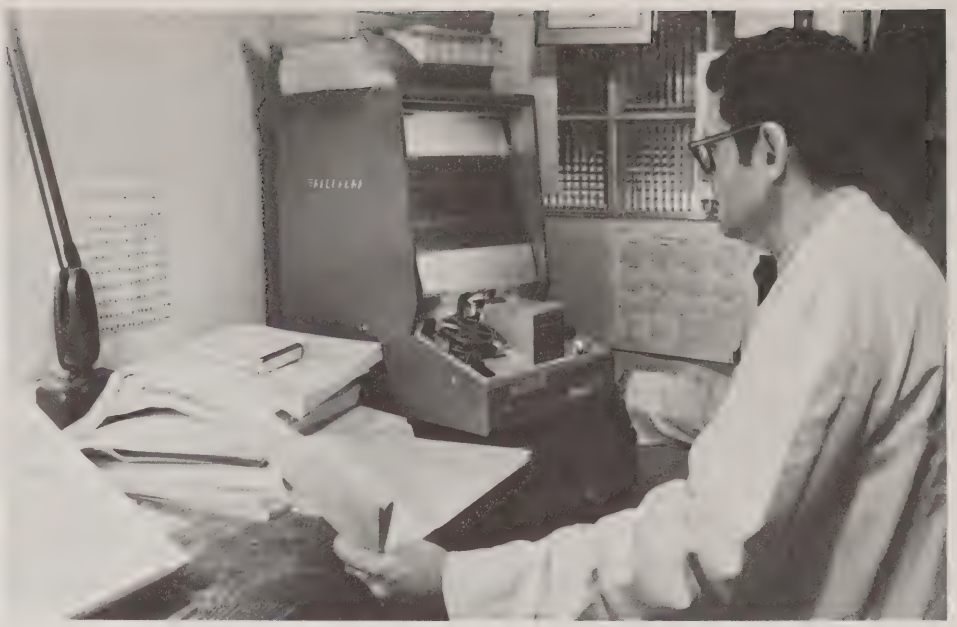
"Most employers will take on criminals or the mentally retarded before they will hire an epileptic," said Dr. Edward R. Wolpow, an MGH neurologist, "even though the epileptic might work for 50 years without showing any abnormality."

In reality, with a few exceptions, there is no reason why he should not be given any job for which he is qualified.

What causes epileptic seizures? The brain produces electrical impulses. When it is unable to control and limit the time and place for release of these impulses, an epileptic attack results.

There are myriad reasons for this runaway action, such as inflammation in a part of the brain, scar formation from an injury, interference with normal function due to a tumor or a clot of blood, or disturbances that result in a lack either of oxygen or of a form of sugar (glucose) required in normal brain-cell activity.

Dr. Robert S. Schwab
The first physician to prescribe Dilantin for epileptics



Dr. Edward R. Wolpow, MGH neurologist, uses microfilm reader to compare patient's current brain waves (recorded on electroencephalogram) with one of the same individual taken several years ago.

Most patients with epilepsy have no obvious cause for the seizures, even after extensive medical tests.

The electroencephalograph, which records the electric activity of the brain, is the principal tool used to detect the disorder. Occasionally, however, the EEG will show nothing wrong when, in fact, epilepsy is present. Even after death, an autopsy can fail to turn up anything abnormal.

"The trouble is in the brain, of course," Dr. Wolpow said, "but it might be at the biochemical level where it is difficult to sort things out.

"One of the points we emphasize is that epilepsy is a clinical diagnosis. The EEG is helpful, but an abnormal EEG does not, by itself, make the diagnosis."

Epileptics number over 4 million, or 2 percent of the nation's population. More than 1,000 are treated annually at the MGH. In the vast majority of cases, medication can control the disorder.

The ailment is equally prevalent among males and females and is noticed most often before age 7 or 8. The older a person, the less likely he is to develop the condition.

The three most frequently encountered varieties of seizures are "grand mal," "petit mal," and "psychomotor" attacks.

In grand mal, the patient's muscles rhythmically contract, and he loses consciousness. Incontinence may occur. The attack may last up to five minutes, and deep sleep, a headache, or muscle soreness may follow. Possible at any age, the attacks are sometimes associated with organic brain disease.

A trancelike state lasting from 1 to 30 seconds is seen in petit mal. There may or may not be a loss of muscle tone. These seizures occur predominantly in children and almost never begin after age 20. They never indicate gross brain damage.

Psychomotor attacks are minor seizures, lasting one to two minutes (rarely longer), during which the victim may stagger about, unaware of what he is doing. He may utter unintelligible sounds and resist help. Mental confusion could consume another one or two minutes after the attack ends. These episodes are usually associated with damage in a temporal lobe of the brain.

"More often than not, children with epilepsy are given phenobarbital, which came into being around 1912, and most adult patients are put on Dilantin, the development of which represented a big advance in controlling seizures," said Dr. Wolpow, an Assistant Professor of Neurology at Harvard Medical School.

"The late Dr. Robert S. Schwab, who directed the Brain Wave Laboratory at the MGH, was the first physician any-

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Rx for Epilepsy: Medicine and Understanding

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where to prescribe Dilantin for epileptics. That was in 1938. Previously, only phenobarbital was available for these patients.

"There are other drugs now such as Mysoline and Zarontin. Recently, Tegretol, a medication for trigeminal neuralgia [a form of nerve pain] was found to be a very good anticonvulsant, so we've started to use more of that.

"It's useful to have these alternatives because, although Dilantin is very effective, it does produce a rash in about five percent of those who take it and in some patients it is not sufficient to control seizures. Zarontin is the best drug for petit mal."

The most important recent advance in the practical control of epilepsy has been the ability to measure the levels of all commonly used anticonvulsants in the blood of patients. Each person's body absorbs these medications differently. By knowing how much still courses through the patient's bloodstream, the doctor can regulate further dosages with considerably more accuracy.

For the very small percentage of epileptics unresponsive to or unable to tolerate any drugs, several types of brain surgery may be considered.

Often after medication is stopped, the patient never experiences another seizure, but that phenomenon cannot be attributed to the drugs.

"The drugs control. They do not cure," said Dr. Wolpow. "There might be a scar in the brain which just ceases to be epileptic for reasons we can't explain."

What are the chances of death from epilepsy? In most instances, if death results, it is not from the disease itself, but from accidents, such as drownings.

Most epileptics, however, live an average life span. They are encouraged to continue as normally as possible, but to keep ever in mind that they must avoid any activity in which a second's loss of consciousness could prove dangerous.

Should a patient swim? Yes, but not alone. Go horseback riding? If he has company. How about skiing? If it is cross-country skiing, fine. If he plans to go tearing down a slope at high speed, no.

Recreation such as movies, dancing, and other social activities is encouraged, but alcoholic drinks are forbidden. Dr. Wolpow explained:

"Alcohol is a convulsant. Any normal person given enough to drink may have a seizure. The epileptic can ill afford that little push."

In Massachusetts, an epileptic can qualify for a motor vehicle operator's license by producing a medical certificate attesting to an absence of seizures over the previous 12 to 18 months. In addition, the Registry of Motor Vehicles requires periodic medical reevaluations. Most other states grant similar driving privileges.

Social acceptance, rather than accidents or alcohol, remains the major concern of epileptics. In addition to hitting hard at those among them unable to find work, the recession has caused many other epileptics to be laid off from jobs, and they're not getting them back. "We are noticing this more and more lately," Dr. Wolpow said.

Psychotherapy may be needed to treat feelings of inferiority, self-consciousness, and other emotional problems. Instead of an overly protective or patronizing attitude, physicians urge relatives to take a commonsense approach toward the patient's illness with emphasis on keeping him physically and mentally alert.

There should be encouragement for adults to work and children to attend school.

Deep-seated fears exist in the minds of many epileptic children. Among questions they ask themselves is: "Am I stupid?"

Tests conducted among hundreds of youngsters who have seizures show they are just as bright as other children.

Electroencephalograph operated by Miss Ellen Gill, technician, is recording brain activity of patient asleep in next room.

MGH News

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Clinic Tries to Lessen Heart Risks Among Young

Studying Possible Clues to Arteriosclerosis

Two children who died 35 years apart have put MGH researchers on the track of a substance which may be a cause of arteriosclerosis.

Commonly known as hardening of the arteries, the disease takes more lives in the United States each year than any other malady.

A curious chain of events sparked the research:

A two-month-old boy died in 1968 from arteriosclerosis, a condition which is almost never seen at this early age. He was known to have been deficient in a certain enzyme (a protein which promotes chemical reactions within the body).

Researchers recalled that three years earlier the late Dr. Mary L. Efron, an MGH neurologist and biochemist, had described a Boston family of children with an inherited enzymatic disorder.

The family, it turned out, was related to an 8-year-old boy who died in 1933 from arteriosclerosis.

Suspecting a possible link in the two deaths, Dr. Kilmer S. McCully, an MGH Associate Pathologist, obtained the files of both patients and made a comparison. He found that the two children had different enzymatic defects, but they had one thing in common. The tissue of each child contained high levels of an amino acid called homocysteine. Amino acids are the building blocks of proteins.

"The elevated concentrations of homocysteine in both children immediately suggested to me," Dr. McCully said, "that the compound itself or some derivative of the compound produced by metabolism had actually caused the changes in the arterial walls."

Manufactured in the liver by another amino acid called methionine, homocysteine normally is converted quickly into other substances. However, laboratory studies directed by Dr. S. Harvey Mudd at the National Institutes of Health in Bethesda, Md., and by Drs. Harvey L. Levy, Vivian Shih, and Richard W. Erbe at the MGH showed that at least three enzymatic deficiencies, all inherited, can interrupt this conversion process and leave the homocysteine to accumulate in tissue fluids.

Dr. McCully and his associates also demonstrated in animals that homocysteine has the capability of causing

(Continued on Page 6)

Using ophthalmoscope, Dr. Richard R. Liberthson checks eyes of David Shirkey, 11, for blood-vessel changes from hypertension.

A team of MGH specialists has embarked upon a "Children's Crusade" to help lower the incidence of heart disease in this country.

Inspired in part by the late MGH cardiologist Dr. Paul Dudley White, the team has established a Pediatric Cardiac Risk Factor Clinic at the hospital.

The strategy is to locate children with conditions that could later cause heart trouble and, through innovative treatment, alter this course while they are still young.

Codirected by Drs. Allan Goldblatt, MGH Chief of Pediatric Cardiology, and Richard R. Liberthson, pediatric and adult cardiologist, the clinic offers New England's first comprehensive heart-risk screening program devoted entirely to children. Fewer than six such facilities exist in the entire country.

Associated with Drs. Goldblatt and Liberthson are Dr. Robert S. Lees, Director of the Noninvasive Diagnostic Laboratory at the MGH and the Arteriosclerosis Center at M.I.T.; Dr. Mary Etta King, a Clinical and Research Fellow in pediatrics; and a team of special consultants.

To date, most of the children examined at the clinic were referred by physicians who detected irregularities of blood pressure or lipid (the fatty substances, cholesterol and triglycerides) metabolism during largely routine physicals.

Three-quarters of the patients (mostly in the 6-to-13-year age bracket) are requiring treatment for excessive cholesterol (hyperlipidemia) or high blood pressure (hypertension), two key

(Continued on Page 2)

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EDITORIALS:

Toward Preventing Heart Attacks

In the 1930s Dr. Paul Dudley White began calling for prevention as a key to overcoming heart disease. By the 1950s the MGH cardiologist, looking at mounting scientific evidence, started to lay increasing stress on this area. Toward the end of his career he called for a "Children's Crusade" to begin prevention in the early years of life. A page 1 article in this issue describes how another MGH cardiologist who heard Dr. White's plea organized a Pediatric Cardiac Risk Factor Clinic as one means of fulfilling the late doctor's dream. Only a few months old, the clinic is scarcely out of the starting gate. But the very concept is one that serves as a memorial to Dr. White. One can almost imagine the twinkling eyes and broad smile with which he would have greeted the news.

* * *

Another page 1 article in this issue involves research of major concern to the new clinic. This research is delving into areas that show early promise of untying some of the tightest knots which secure the mystery of arteriosclerosis, or hardening of the arteries. One is tempted to speculate what "breakthroughs" this investigation may lead to. Research, however, is a slow process. Often the untying of one knot leads to the discovery of another previously invisible one. And so, stifling the urge to predict, we will satisfy ourselves with the cautious, if benign, observation that the study is an exciting one that will bear close watch in the next few years.

A Courageous Patient – A Famous Ward

A page 8 article in this issue celebrates a golden anniversary – that of a patient who began coming to the MGH ambulatory facilities 50 years ago this month. For Miss Delia Foley the MGH clinics have been her sole source of medical care over the past half century. Although she has faced lifelong crippling disease, she has maintained courage and optimism throughout her life. In a sense she represents the spirit of the patients who have looked to the MGH for their health needs for the more than three times 50 years the hospital has cared for the sick.

* * *

"Ward 4" carries a special meaning in modern medical history. A number of important discoveries originating there have made that small MGH unit famous in American medicine. A book entitled simply *Ward 4* further added to its renown. Despite its fame in medical circles, the unit, as distinct from its discoveries, is largely unknown to the general public. All the more reason to observe in a page 4 article another 50th anniversary – that of the ward where the scientific findings have far outstripped the few square feet it occupies in the hospital's original Bulfinch Building.

Three-Pronged Plan Devised to Overcome Risk of Heart Injury

(Continued from Page 1)

factors in the development of arteriosclerosis, or hardening of the arteries. This is a frequent precursor of heart attacks.

"The first thing we do," Dr. Goldblatt said, "is to reproduce the results that have been obtained elsewhere to document that there is an abnormality.

"Then we proceed to rule out other potential causes until we have a good idea of what we're dealing with. From that point we go into a three-pronged treatment program.

"This involves education, diet, and drugs. Drugs are withheld until the other phases have had an opportunity to alter the condition. If they don't work, then medication enters the picture. Obviously we don't want to commit children to long-term medication unless it is necessary.

"We know that with proper treatment hypertension can be lowered. We can also reduce excessive cholesterol. But we cannot say for certain that lowering cholesterol will alter the course of coronary disease. We have strong feelings that it will. Therefore, we believe a reasonable chance of success makes the program worthwhile."

Although the clinic is directed toward the pediatric age group, Dr. Goldblatt said that the expertise of the doctors affiliated with the program is such that adults can be treated by members of the same professional team. Both parents and children, therefore, could come under the same medical management.

When one child in a family is referred to the MGH clinic because of abnormally high cholesterol, arrangements are made immediately to check everyone else in that family, including the parents.

After each visit by a patient a letter goes back to the referring physician to keep him fully abreast of what is being done and why. He is an integral part of the continuing treatment and education for this family.

Planning began well before the clinic's unannounced opening last fall, and

Photographs: Pages 1, 3-7, Joel Salhanick; p. 8, Mary M. Hoffmann.

staff members still search for innovative techniques and procedures. Drs. Liberthson and King recently visited similar centers in Miami and Cincinnati to study their operation.

Although still in its infancy, the MGH unit nevertheless seems to be well underway in treating forerunners of possible heart disease. Several dozen children already are under the care of the medical team.

The clinic presently is conducted once a month in the Pediatric Ambulatory Care (outpatient) Division of the MGH.

Word of the screening program has circulated in several ways. Members of the staff continually address community health and school department groups. The unit mailed letters to pediatricians throughout Massachusetts and to all other physicians in New England who, in the past, referred children with heart problems to the MGH. Then, too, families hear of the clinic by word of mouth from other families.

As a result of relative notifying relative, a mother in Rio de Janeiro may soon bring her two children 5,000 miles to the clinic in Boston.

The woman's husband died in his early 30s from a heart attack, and she learned through her doctor in Rio that her two children have elevated cholesterol.

The MGH visit was advised by her sister-in-law who moved to the Boston area from Brazil several years ago after her own husband, also in his 30s, had succumbed from a heart seizure. Due to high cholesterol, two of her three children are under MGH care.

David Shirkey has his blood pressure taken by Dr. Mary Etta King in examining room at MGH Pediatric Cardiac Risk Factor Clinic.

The idea for the clinic came to Dr. Goldblatt after hearing a talk by the late MGH cardiologist Dr. White.

"About four years ago," Dr. Goldblatt said, "I attended a meeting at which Dr. White stressed that the time had come to attack the cause of coronary disease in this country.

"He labeled it a 'Children's Crusade' because he felt it would be through children that we would find a way to prevent the catastrophic problems associated with coronary disease in later life."

Heart disease accounts for nearly 45 percent of all deaths in the United States each year. The cost of caring for heart patients soars to over $3 billion annually.

With the help of the Greater Boston Chapter of the Massachusetts Heart Association, Dr. Goldblatt, Associate Professor of Pediatrics at Harvard Medical School, pioneered a heart-risk screening program in the Newton school system.

Over the past two years, 1,900 Newton seventh graders have participated. Fifteen percent turned out to have elevated cholesterol and eight percent had high blood pressure. Family physicians received the test results to determine the need for any special follow-up care.

"School and health officials in Newton became so interested in this," Dr. Goldblatt remarked, "that the screening is now part of the Newton School Department budget.

"Every year, the seventh graders will get hypertensive and lipid evaluations as part of a science curriculum that has been changed to teach more about body health and body needs.

"We also have interested some physicians on Cape Cod in possibly initiating a heart-risk screening program in schools in their area."

More people are prone to heart at-

(Concluded on Page 6)

David rests quietly while Dr. Allan Goldblatt listens carefully to the youngster's heartbeat.

WARD 4

Meeting Challenges To Medical Science For a Half Century

A young housewife in upstate New York complained to her family physician of muscle cramps and excessive fatigue. Daily household duties had become increasingly unmanageable burdens. Frequent periods of rest failed to alleviate the exhaustion.

The woman, in her 30s, was seriously ill. How she returned to good health exemplifies the work carried out in the MGH's metabolic research unit, Mallinckrodt-Ward 4, which recently marked its 50th anniversary.

The patient was suffering from a deficiency of calcium in the blood due to a lack of hormone from the parathyroid glands (hypoparathyroidism). These glands maintain the blood concentration of calcium, which is vital for health.

Doctors in New Jersey had operated on the woman some years earlier for removal of a thyroid cancer. Although successful, the surgery necessitated removal of the parathyroid glands located next to the cancer.

The patient failed to respond to the usual treatment for hypoparathyroidism and for several years her serum-calcium level persisted at about 50 percent of normal. Her mounting weakness was frequently accompanied by muscle spasms.

Since extensive research on her disease had been conducted in Ward 4, the ailing housewife was referred to the MGH unit. Detailed tests indicated her principal problem was her body's inability to activate vitamin D.

The vitamin is essential for proper absorption of calcium from the diet and for exchange of calcium between the blood and bones.

Using a newly developed, preactivated form of vitamin D, the doctors of Ward 4 restored the patient's serum-calcium level to normal.

With instruction to take one dose of preactivated vitamin D each day, the woman returned home feeling well for the first time in years.

Dedicated to the proposition that the research of today is the treatment of tomorrow, Ward 4 has become world famous in medicine. Its contributions to the alleviation of human suffering are many.

The unit occupies a compact corner on the first floor of the historic Bulfinch Building at the MGH. The facility embraces only 10 beds, but each is reserved for a patient with some type of metabolic illness that remains a challenge to medical science.

By following a precise routine so that specialists can study his disorder, every patient not only betters his own chance of recovery but also the chances of others with the same misfortune.

Time study of calcium turnover is being conducted in Ward 4 by Dr. Robert M. Neer, assisted by Miss Karen Koumjian, research technician.

Since he is literally a partner of the doctor in the advancement of medical knowledge, no expenses of any sort are assessed against the patient if he lacks appropriate medical insurance coverage.

When the facility opened late in 1925, its first use was the study of lead poisoning, then an important industrial hazard (*MGH News,* March 1974). How lead enters the body, what becomes of it, and how it inflicts damage were made clear through observation of the ward's volunteers coupled with nonpatient laboratory studies. The principles of prevention and cure were established, and soon industrial lead poisoning was no longer a major menace.

Studies followed on calcium because of certain similarities to lead. Unlike lead, though, calcium is a natural constituent of the body, principally in the bones.

In the ensuing years many problems involving diseases of the skeleton were clarified. Diagnoses became more precise, and new methods of treatment evolved.

The relationship between bones and the endocrines (the body's ductless glands) became apparent early in the research and led to important discoveries in this field, such as the recognition and diagnosis of overactive tumors in the parathyroid glands (*MGH News,* November 1972).

When these glands overproduce, the skeleton shrinks. The patient's kidneys also become seriously impaired from excess calcium passing through them. Surgical removal of the parathyroid tumor can remedy the condition.

Kidney involvement in hyperparathyroidism opened the way for investigations into kidney stones and resulted in valuable contributions to the treatment of this problem.

From lead to calcium to endocrine glands to kidneys, the search went on in Ward 4 to solve the mysteries of medicine.

Among other diseases studied have been dwarfism, acromegaly (recurrent growth of extremities), rheumatoid arthritis, diseases of the thyroid glands, high blood pressure, accelerated aging, complications of diabetes, and various forms of cancer and heart trouble.

In addition to administering preactivated vitamin D to people unable to stimulate the vitamin naturally, Ward 4 researchers in recent years have:

- Demonstrated the first effective

Miss Jane Gillis, RD, dietitian in Ward 4, uses special scales to assure precise weight of foods prescribed for patient on metabolic constant diet.

treatment for Paget's disease (a relatively common bone disease) with the hormone calcitonin, recently approved for general physician use.

• Demonstrated the value of proton beam irradiation of the pituitary (master) gland for pituitary tumors (*MGH News,* March 1973). Surgery for removal of these tumors is much more costly and hazardous to the patient.

• Established the value of a new blood hormone test in diagnosing parathyroid diseases.

• Developed new ways to evaluate patients with abnormalities of calcium absorption or with mild forms of thyroid or parathyroid diseases.

Dr. Alexander Leaf, MGH Chief of Medical Services, has overall responsibility for the research ward. Dr. Robert M. Neer, Associate MGH Physician, handles its day-to-day administration.

A question frequently posed is:

"Why hasn't the ward grown in size along with the rest of the hospital?"

Dr. Neer, Assistant Professor of Medicine at Harvard Medical School, explained why the 10-bed capacity has remained constant:

"The kinds of studies conducted in the ward really cannot be done with large numbers of patients. These investigations require a high ratio of doctors and nurses to patients.

"Many studies include collecting blood samples and urine specimens at frequent, carefully timed intervals. In some studies, hormones or other drugs must be infused continuously at carefully controlled rates. In other studies, the position of the patient may be very important; the patient might be called on to remain standing for four hours. Others might have to lie down for that length of time. Many of the procedures carried out in the ward are new.

"About half the investigations require a patient to be on a special diet. Some diets call for identical menus daily with everything carefully measured and weighed. Others allow varying foods but may restrict salt or calcium intake. Many of the studies require complete urine collections, and some require collection of all excreta."

The minute attention to such details enables doctors to assess more accurately bodily changes that may take place during treatment.

Assisting the researchers are Fellows (physicians training in special fields), who serve on a rotating basis; seven registered nurses headed by Mrs. Grace Good, RN; a dietary staff of five directed by Miss Jane Gillis, Research Dietitian; Miss Denise Pomodoro, Recreation Therapist; and a ward secretary, Mrs. Frances O'Connor.

Long stays in Ward 4 were common at first. Today, the average patient remains six or seven days with a few of them present up to six weeks.

Every effort is exerted to make patients comfortable and content.

In addition to radio, television, and books, leisure activities include lessons in arts and crafts, trips to sports and other events, and, for some patients, brief trips home.

A moving account of how Ward 4 was born, went through financial pangs during its formative years, and ultimately gained world stature was penned by Dr. James Howard Means several years after he retired as the MGH Chief of Medical Services.

Published by the Harvard University Press in 1958, the book, entitled simply *Ward 4,* was aimed at the general reader. In recounting the unit's history, Dr. Means brought into sharp focus the vital role of research in improving care in any teaching hospital.

Ward 4 was conceived by the late Dr. David L. Edsall while he was the MGH Chief of Medicine. When in 1924 he became Dean of Harvard Medical School, his successor, Dr. Means, inherited not only the ward concept but Rockefeller Foundation funds secured by Dr. Edsall for enlargement of the Bulfinch Building.

Ward 4 opened on November 4, 1925. There was no special significance to the number "4" in the name. It was short and did not duplicate the number of any other MGH ward.

The facility's total outlay for board, room, and medical services during its initial year came to $15,000. For seven years, grants from outside sources supported the ward. Then the Great Depression hit, drying up the aid flow to a level where, on July 5, 1932, the unit had to be closed.

An $8,000 grant from the Hyams Foundation permitted a reopening 17 months later. But soon this lease on life expired. Convinced that clinical research was essential to providing the best patient care, the MGH trustees voted to underwrite the ward's expenses with unrestricted endowment. The policy of meeting research costs from general revenues was rescinded in 1946 to prevent patients from paying for such costs.

A formal MGH research fund was established in 1946 with $130,000 in grants from the pharmaceutical industry. Then, early in 1947, the hospital's Committee on Research was born. One of its initial acts was to allocate $30,000 annually to meet the costs of Ward 4.

The facility is named in honor of the late Edward Mallinckrodt, Jr., of St. Louis, who was board chairman of the Mallinckrodt Chemical Works in that city. A Harvard graduate and former Harvard Overseer, he had a lifelong interest in science and was a staunch benefactor of the ward.

His interest in the MGH developed

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Ward 4

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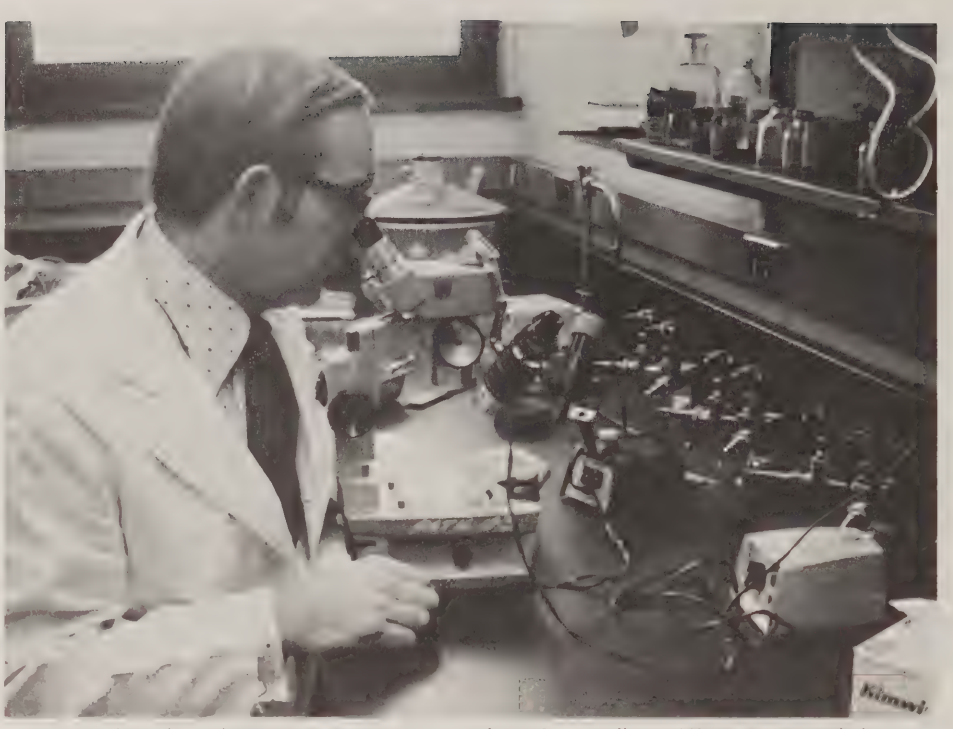
in the early 1930s. His first direct contribution to Ward 4 came in 1945 when he assumed the expenses of one bed. This assistance mounted steadily until in August of 1948 the trustees voted to name the ward in his honor.

A bronze tablet signifying this tribute was unveiled in the ward the following March.

Five years later, Mr. Mallinckrodt launched an endowment which continues to play a vital role in support of salaries for investigators concerned with clinical studies on Ward 4. However, the great increase in the hospital's operating costs has led to new mechanisms for support.

In recent years about two-thirds of the ward's annual cost has been borne principally by a grant from the National Institute of Arthritis, Metabolism and Digestive Diseases, a department of the National Institutes of Health.



Peering through a dissecting microscope, Dr. Kilmer S. McCully, MGH Associate Pathologist, measures the width of cartilage (epiphyseal) of rats whose growth hormone has been surgically removed.

Heart Clinic

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tacks than ever before. Surprisingly, strides in the advancement of medical knowledge can, to some degree, be blamed for the statistical increase.

As medical discoveries have dramatically lessened or eradicated many infectious diseases, and consequently their threat of death, the potential population for exposure to other ailments has increased. In particular, diseases of the heart that occur in adult life have gained greater opportunity to develop.

Ample evidence points to elevated cholesterol for an increased incidence of atherosclerotic changes leading to possible heart trouble, but no proof exists that lowering cholesterol will cause lesions in human arteries to regress. The risk-factor team can only hope, and assume, that it will. Meantime, the emphasis must be on preventing the buildup of excessive cholesterol.

Asked whether he was apprehensive that the new clinic might become inundated with patients as more and more people learn of it, Dr. Goldblatt stated:

"We'll cross that bridge when we come to it. Insofar as preventive medicine is concerned, that could only be a sign of good things."

Arteriosclerosis Is Rare Until Late Teens

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hardening and narrowing of arteries by stimulating the growth of cells along inner arterial walls.

By creating obstructions that reduce blood flow through arteries, the human disease seems to set the stage for possible heart attacks, strokes, kidney failures, and a host of other serious ailments.

Methionine, the only source of homocysteine, is essential to human nutrition and is found in diets rich in animal protein (meats, eggs, cheese). These diets also contain abundant cholesterol and saturated fats.

Methionine is particularly important in the normal growth process. Children, therefore, require it in much greater quantities than adults.

Excessively rapid growth in childhood is sometimes symptomatic of an overproduction of homocysteine by methionine. A derivative, homocysteic acid, acts like pituitary-growth hormone, causing accelerated skeletal development.

Significant arteriosclerosis seldom builds up in humans during childhood and adolescence. Ordinarily, lesions first appear in the arteries of susceptible young men and women (mostly men) in the late teens and early twenties when growth has virtually ceased.

Over the next 10 to 20 years, the arterial narrowing progresses to the point where symptoms may begin to surface, usually in the form of angina pectoris (a heart condition characterized by chest pain) or myocardial infarction (heart attack).

Dr. McCully demonstrated with rats the growth-promoting properties of homocysteine. Ordinarily any mammal including the rat and man will cease to grow if its pituitary gland fails to function. After injection with homocysteic acid, rats whose pituitary glands had been surgically removed nevertheless continued to develop.

This acid also accelerated the growth rate of normal guinea pigs and rabbits.

Financed by the National Institutes of Health and the American Heart Association, Dr. McCully's research team showed, too, that substantial doses of homocysteine thiolactone (present in animal fats) could in just three weeks produce prominent arteriosclerotic patches (plaques) in rabbits.

The interiors of the rabbits' coronary arteries were severely narrowed by scar tissue, and a marked thickening of the arterial walls resulted from a multiplication of cells.

When cholesterol was added to the diet of these rabbits, fat droplets rapidly accumulated on the scars.

After a month or two of heavy daily

injections of some form of homocysteine, many of the rabbits developed blood clots in their veins. These clots then traveled to arteries of the lungs, causing death by blocking blood flow (pulmonary embolism).

"This is a known complication of cardiovascular disease," said Dr. McCully, an Assistant Professor of Pathology at Harvard Medical School. "We were able to show, however, that if we gave the animals pyridoxine [vitamin B6] the thrombosis [clot formations] could be prevented."

Pyridoxine is effective in correcting a deficiency in cystathionine synthetase, the most common of the three enzymatic defects capable of raising homocysteine levels.

The other troublesome enzymes are: (a) methyl transferase, treatable with vitamin B12 and methyl folic acid, and (b) methylene folate reductase, for which folic acid alone is prescribed.

Dr. McCully said preliminary results of a study conducted in South Africa suggest the administration of pyridoxine, coupled with a diet restricted in animal protein, prevented arteriosclerosis in a group of individuals with coronary heart disease.

A number of drug-diet combinations have been proposed to reverse, or at least stop, arterial damage. But Dr. McCully believes pyridoxine offers the best potential.

"One reason," he explained, "is that pyridoxine is a normal vitamin which we get in our food [beef, fish, eggs, cereal] every day. Some of the other substances being considered are synthetic chemicals which have been added to the diets of laboratory animals.

"It would be much better to be able to give a vitamin to the people than some synthetic agent. We're not sure what form of pyridoxine to give, however. We're working on that now."

Although animal studies repeatedly implicated homocysteine as an initiator of arteriosclerosis, Dr. McCully emphasized:

"We have not proved that the homocysteine theory will necessarily enable us to control the disease in humans. But the important thing, we feel, is that it gives us a certain clue where to look further."

The clogging of blood-vessel walls contributes directly to about 880,000 deaths in this country each year.

Elevated blood pressure is a major risk factor in arteriosclerosis. Various studies have demonstrated that hypertension can generate a 10-fold increase in cells in the arterial walls of experimental animals.

An estimated 24 million Americans suffer from high blood pressure, but only half that number are aware of their condition. To make matters worse, only a small percentage of those who do know seek treatment.

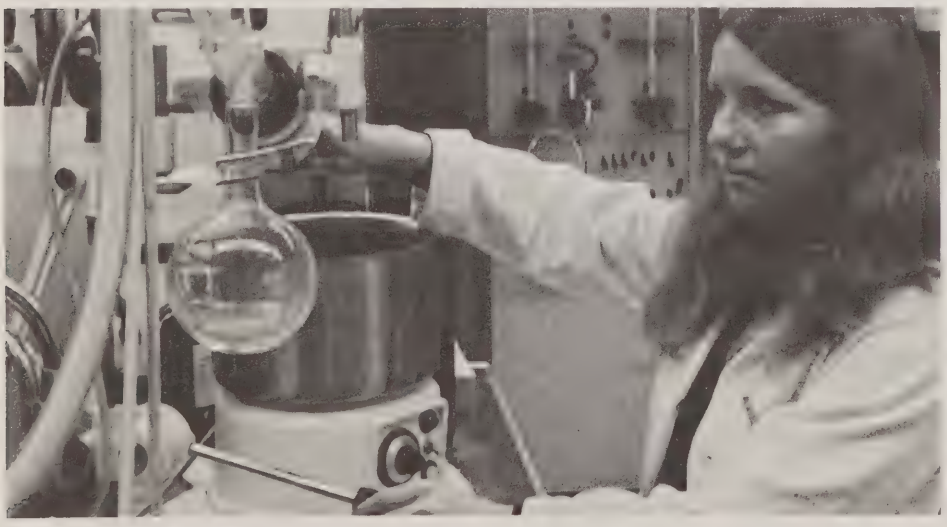
The susceptibility of hypertensives to arteriosclerosis increases when their serum-cholesterol level is also elevated. Diets containing large amounts of cholesterol and fats are routinely employed to induce hardening of the arteries in laboratory animals.

Cigarette smoking is a major cause of deterioration in patients with peripheral vascular disease (a common form of arteriosclerosis).

Patches often develop on the walls of the aorta (the body's main blood vessel) just before it divides into arteries that carry oxygen-rich blood to the legs. Nicotine can cause the arteries to constrict and further diminish blood flow through the damaged vessels.

Failure of the legs to receive sufficient oxygenated blood can lead to gangrene, or death of tissue. This often necessitates amputation of a limb.

Other risk factors in arteriosclerosis include diabetes, obesity, sedentary living, and a family history of the disease. The familial aspect may be due, at least in part, to the fact that families tend to consume the same sort of diet and share similar modes of life.



Miss Dianne M. Gminski, senior technician in the pathology laboratory of Dr. Kilmer S. McCully, uses a rotary evaporator to prepare a sulfur amino acid for testing in animals.

Delia Foley

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wears a back support and a leg brace.

Her visits to the MGH are easily arranged. "I call the Social Service Department two days before my appointment," she said, "and, because of my restricted mobility, plans are made for a shuttle bus to pick me up outside my home. After the appointment, the bus takes me back to Dorchester." Before the bus became available, a taxi was her only means of transportation.

Other medical centers in Boston are within easier reach than the MGH, but Miss Foley said she would never consider going elsewhere.

"Creating new alliances after transfer of care to another institution," Dr. Stoeckle explained, "can be enormously difficult for patients with long-standing illnesses. They often fear that no one else will really understand what they've been through.

"The fact is that Delia has fostered many beneficial attachments at the MGH. Over the years, she has come to know members of the staff on a first-name basis. She feels quite at home here because she is confident of a personal concern for her well-being."

At the project where she lives, Miss Foley has a host of friendly neighbors who gather together in a recreation room for games, singing, movies, and parties.

Despite her crippling arthritis, she is so skilled in knitting and crocheting that she has taken on a pupil.

"I try to keep myself active," Miss Foley said. "I am always planning some little thing just to keep going."

She finds it incredible that her treatments at the MGH have spanned half a century. "It seems as if they began only yesterday," she commented. "All I know is they've kept me on my feet, and I'm grateful for that."

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Cheerful Spirit Helps in Fighting Adversity

March marks an unusual anniversary for a very plucky lady. Fifty years ago this month Miss Delia Foley began coming to the MGH for her health care.

Excluded from many daily activities by a combination of severe physical handicaps, her outlook on life nevertheless serves as a constant inspiration to both patients and personnel at the hospital.

Miss Foley pushes through its doors on an average of twice a month to keep ambulatory (outpatient) appointments. Sometimes the date is with orthopedics. At other times: gynecology, urology, neurology, dermatology, podiatry, or medicine.

"When I was a little girl, people used to say there was no hope for me," she related, "but I said to myself, 'I'm going to hang on.' "

And with the medical support of the MGH, she has done just that.

Since birth, cerebral palsy has debilitated the 4′ 11″, 100-pound resident of Boston's Dorchester district, causing loss of her leg function. In addition, rheumatoid arthritis has sapped much of the strength in her hands and arms. She is also sightless in one eye and frequently requires medical attention for urologic problems.

Despite her handicaps, the 66-year-old patient is described by the MGH personnel involved in her care as an "absolute delight."

"I've always been struck by her cheerfulness during her visits," said Dr. John D. Stoeckle, director of the MGH Medical Clinic and her primary-care physician for the past five or six years. "It's remarkable how well she copes with her severe disabilities. She's extremely self-sufficient, primarily, I think, because she has trained herself to be that way."

Dr. Stoeckle watches over Miss Foley's general health and directs her to different ambulatory units for specialized treatment. Although her many problems make her care interminable, she remains good-natured and always punctual.

A native of Portland, Me., Miss Foley was the oldest of six children in her family. Because of her congenital disorder, she was seven years old before she managed her first step. The family moved to Boston when she was 14 with the hope of finding some effective medical treatment for her.

The MGH visits began in March 1926, with arrangements for the first of a long series of operations to help her contend with her infirmities.

As the years passed and members of the family either died or established their own homes, Miss Foley found herself alone with her aging mother and handling the immediate needs of both.

Now 94, her mother resides in a nursing home, and Miss Foley lives alone in an apartment in a housing development for the elderly and handicapped. Ramps and other special devices facilitate her getting about.

Soon after she moved in, the intensely independent Miss Foley asked the MGH Social Service Department to discontinue four hours of homemaker services that were being provided each week.

The social worker, Miss Joan McNamara, reported:

"Miss Foley expresses a great amount of pride both in having her own home and in her ability to keep it clean. Despite her disabling handicaps, she seems admirably motivated and enthusiastic about assuming responsibility for herself.

"She will continue, however, to receive assistance in obtaining groceries. She does not seem to view this as detracting from her independence."

Miss Foley moves about assisted by a special walker equipped both with wheels and a seat. In addition, she

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Miss Delia Foley enjoys chat with Dr. John D. Stoeckle, her primary-care physician, during clinic visit marking her 50th anniversary of MGH health care.

MGH News

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Learning How to Relax Can Help Overcome Pain

New Drug Combats Erratic Bone Disorder

How do you cope with a bone disorder of unknown origin whose clout is totally unpredictable?

Doctors have posed this question about Paget's disease ever since it was first described in the late 1800s by an English surgeon, Sir James Paget.

Several million Americans may have Paget's disease, but only an estimated 100,000 need specific treatment. While in most of those afflicted the malady is so mild that it requires no attention, it strangely runs rampant in the others, producing deformities and a wide range of concomitant complications.

Long, painstaking research, including studies at the MGH, finally has produced the first safe and effective treatment for the disease.

Using a new drug called salmon calcitonin, approved by the U.S. Food and Drug Administration, many patients have reported marked relief from pain and other symptoms.

The disease is characterized by a softening and bowing of bones, plus an uncontrolled remodeling that thickens and enlarges the deformed bones but leaves them structurally weak.

Although the cause of this problem remains unknown, the new drug manages to slow the rate of bone turnover.

The effectiveness of salmon calcitonin was first demonstrated to the medical world in Ward 4 (*MGH News,* March 1976), the famed metabolic research facility at the MGH, by Drs. John T. Potts, Jr., Chief of the Endocrine Unit; Stephen M. Krane, Chief of the Arthritis Unit; Robert M. Neer, in charge of the ward's day-to-day operations; and Frederick Singer, then a Clinical and Research Fellow in Medicine.

Dr. Singer is now on the faculty of the University of Southern California School of Medicine.

A hormone found in most living creatures, calcitonin was unheard of until the mid 1960s. In British Columbia an orthopedic surgeon and researcher, Dr. Harold Copp, developed indirect evidence of a substance which could lower serum calcium. He named this hypothetical material calcitonin.

Later, Drs. Philip Hirsch and Paul Munson at Harvard Dental School confirmed the presence of calcitonin in the thyroid gland of mammals and reported that it had the capabilities Dr. Copp had suggested.

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Pain unit patient finds emotional release by pounding clay and slamming it onto tabletop.

"Being in constant pain changes your personality. You're not rational. You're not easy to please. You're not a very nice person. I don't see how anyone can be if he's constantly in excruciating pain. Consequently, people around you suffer, if they stay around you."

These are the words of a Rhode Island construction worker who suffered back injuries in an on-the-job accident. Still in agony after several operations and years of treatment, he sought relief in the pain unit of the Massachusetts Rehabilitation Hospital in Boston.

Following three months of treatment, the 40-year-old father of three was discharged, feeling vastly improved. Although still troubled with occasional discomfort, he nevertheless is able to cope with it without medication.

Instead of returning to his construction job, the patient reenrolled in college to complete a course in management which he had started long before his accident. Once each week he returns to the Rehabilitation Hospital for continuing care as an outpatient.

What is unique about the pain unit? The explanation was provided at an MGH medical meeting (Psychiatric Grand Rounds) by the unit's director, Dr. Nathaniel R. Hollister, who is also a Clinical Associate in Neurosurgery at the MGH:

"The unit's program is built around the idea that pain is something more than a response on the part of a person to injury to his body. We're saying that pain is actually a learned form of behavior.

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EDITORIALS:

The Enigma of Pain

Severe chronic pain is one of the scourges of mankind. Often incapacitating, it at best limits the activities and enjoyment of life. And while pain must date from the first animal on earth, intricacies of the problem continue to elude medical science. Theories about the underlying mechanism of pain remain just that – theories. And different individuals react differently to it. A 300-pound, 7-foot giant may scream at a small cut, and a 4-foot, 11-inch girl may remain impassive to a crushing blow. Why? It is fairly safe to say that pain is unrelated to body structure. Similarly many members of one ethnic group might remain stoic to pain that unnerves those of another group. Why? Probably upbringing, as in the case of the American Indian raised to "be brave" in the face of pain and danger. However differently individuals react in the face of pain, only people with rare medical problems never feel any whatsoever.

Often patients will complain of pain for which no physical cause seems plausible. The tendency is to dismiss this as "functional." One may think of this type as imaginative – something that exists in the mind but not in the body. Many experts would dispute this, saying that if a patient believes he feels pain, he in fact does.

Confronted with the pain-stricken patient, the physician wishes to help whether or not the cause is physical. Some aches – like arthritis – may be at least partially controlled by long-term medication. Others, like the low-back type resulting from a disk problem, may be treated by surgery.

In fact various forms of treatment have evolved. A page-one article describes a unit that has opened at the Massachusetts Rehabilitation Hospital for the express purpose of confronting the problem. The MGH physicians who treat the patients there are using a variety of techniques. The program is one of several in the country that are taking the broad approach to a problem of such long standing.

* * *

Twenty-five Quiet, Productive Years

Sometimes an organization works so quietly and so well that people not benefiting directly know little about it. Such is the case with the MGH Service League, which is observing its 25th anniversary. An article appearing in this issue of the *MGH News* describes the many activities of a group that has achieved so much for the hospital, its patients, and its staff. The *News* extends its congratulations to the organization for a job supremely well done.

Various Methods Aid In Reducing Tension

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"The program utilizes standard medications, both narcotics and major psychotropic [mind-altering] drugs. It also offers several methods of treatment.

"We can make suggestions for change, offer encouragement, and feed in ideas and possibilities. The patient himself decides what change is to be accepted and what is to be rejected.

"A large part of our program revolves around the teaching of relaxation and encouragement to explore and accept the idea that tension reduction is as direct an approach to pain as a surgical operation."

Integrating the traditional approaches to pain with the powerful techniques of psychological medicine, the unit staff conducts exercise, art, and movement therapy while administering medications in decelerated doses.

MGH referrals represent about two-thirds of the admissions at the Massachusetts Rehabilitation Hospital, and many of its doctors also are members of the MGH staff.

The average patient in the 21-bed pain unit is in his 40s, has had surgery three times, and has failed to respond to conservative treatment. In the 3½ years since the program was established, more than 260 patients (slightly more women than men) have participated. On the basis of an informal survey of 44 people treated in 1975, women appear to show more improvement than men.

A motion picture written, directed, and produced by Dr. Henry D. Abraham, a Clinical Associate in Psychiatry at the MGH, provides an inside view of the unit's operations.

In the film, entitled simply, "Pain Unit," several patients describe the agony they had experienced:

". . . Two weeks after the operation, the pain came back in my leg. I couldn't walk. I kept falling. I had to crawl on my hands and knees to get

Photographs: Pages 1, 3, 7 (lower), Joel Salhanick; p. 4, courtesy of MGH Arthritis Unit; p. 5, courtesy of MGH Endocrine Unit and Radiology Dept.; p. 6 (upper), MGH Photo Lab, (lower), MGH Anesthesia Dept.; p. 7 (upper), courtesy of *Boston Globe;* p. 8, Mary M. Hoffmann.

to the bathroom. That was the only way I could get around if no one was with me."

". . . I was going to this doctor for 2½ years straight, and all he kept saying to me was, 'Lose the weight,' and 'I want you to go into the hospital. I want you to have this operation.' That was it."

". . . I found myself getting very depressed. I said to myself, 'What am I here for?' Nobody was doing anything for me.

"It got to the point where I would go to my doctor and have this feeling that he didn't want to see me any more. There was nothing more he could do. I think the biggest blow was the day I saw a noted doctor here in Boston, and I asked about physical therapy. He told me that I was too old."

"The trouble is there's no place you can send such patients," said Dr. Thomas P. Hackett, Acting Chief of Psychiatry at the MGH.

"Once you begin seeing them, once you show that you're interested, and there are very few physicians who are interested, they latch onto you. And you in turn develop a relationship with them so that you don't want to let them go.

"We don't have the hospital facilities or the personnel to really treat the pain patient as we would like to see him treated."

Dr. Hackett noted, however, that over the last few years a dozen or so pain clinics or pain units have been organized, offering a particular kind of treatment which results in extraordinary gains.

Dr. Nathaniel R. Hollister, pain unit director, seeks connection between patients' pain problems and their individual life-styles.

"I can't explain what happens," he said of the things that occur, "but I heartily endorse them. I think that probably this is the beginning of a new approach toward the chronic-pain patient."

Mrs. Jane Hollister is a psychomotor therapist in the pain unit at the Massachusetts Rehabilitation Hospital. Her job is to induce patients to activate their inner feelings physically.

In the film during psychomotor therapy, a patient experiencing pain in his toes told Mrs. Hollister of a long-standing rift with a brother. "He even accused me of taking some money out of my father's safe," the patient related. "Nobody ever knew what became of the money. This has been on my mind ever since my mother and father died."

Mrs. Hollister inquired:

"What would you like to say to that brother that you've never said before?" The reply:

"Get out of my life now. I'm a big boy. I'm grown up."

Mrs. Hollister had the patient remove a shoe and press his foot against a cushion. "Okay, you want him to get out of your life. Push against that," she instructed.

At a later time, he screamed, "Get out. Get out right now," as if his brother were in the room.

Still later the patient remarked:

"The pain in my toes has subsided. I feel a lot relieved because it has all come out into the open. I never discussed it before, not even with my wife."

"What we find," Mrs. Hollister said, "is that when we give people an arena in which they can work out some of the conflicts and stresses which, for instance, they may have had in their families, the present pain lessens. In some of them it disappears. We don't know at this time exactly how that happens.

"Sometimes, it's as if heavy weights, in a symbolic sense, were lifted. As the stress of the past or the emotional stress is talked about and experienced in an action-oriented kind of way, the person feels better."

The program is comprised of a combination of vigorous physical procedures and a strong psychological orientation. This is carried on in a very supportive environment.

"The approach has proved very en-

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Pain often subsides after mental stress is physically activated during psychomotor therapy.

N.I.H. Group Led Way on Calcitonin Studies

(Continued from Page 1)

Continuing studies showed that calcitonin does not always appear in the thyroid gland. In birds and fish, the hormone is found in another gland, separate from the thyroid, called the ultimobranchial body. Calcitonin from salmon was found to be longer lasting and up to 1,000 times more potent than other types.

Similar studies were being conducted at that time in England and in France. So it became something of a challenge to isolate, purify, and determine the chemical makeup of the hormone from several animal species.

The feat was accomplished by a research team then led by Drs. Potts, Henry T. Keutmann, and Hugh D. Niall at the National Institutes of Health (N.I.H.) in Bethesda, Md. The sequence (chemical structure) of several animal calcitonins including the salmon hormone was determined. Subsequently, the salmon hormone was made artificially to provide material for treatment of Paget's disease.

Dr. Keutmann is now an MGH biochemist, and Dr. Niall is a member of the hospital's Board of Consultation.

Untreated, serious cases of Paget's disease can lead to many infirmities.

Normal bone is somewhat like plywood. One bone layer has fibers running in one direction while another layer, laminated to the first, has fibers taking a different course. As in plywood, this system provides enormous strength.

In Paget's disease, although recalcification often builds more bone than originally present, the bone forms helter-skelter rather than in laminations. As a result, the bone is weak and can give way under pressure.

If the disease arises in the leg bones, the patient may become bowlegged. An ailing bone near a joint such as a hip may not be able to support the load on that joint. Consequently, the normal cushioning in that socket will become adversely affected.

Bone overgrowth can be so exuberant that it may pinch or squeeze a nerve extending through a narrow place next to the bone. Severe pain, or loss of nerve function, can result.

A peculiar characteristic of Paget's disease is the rich blood supply in the affected area. Consequently, the diseased bone literally takes on a reddish hue in contrast to the whiteness of a healthy bone.

The demand for blood also may overtax the output capacity of the heart, thereby triggering heart failure.

Other possible ramifications of Paget's disease include fractures, arthritis, deafness, and compression of the spinal cord, which can lead to paralysis.

Principally affecting people over 30, the disorder becomes more prevalent with advancing years. For some unknown reason it also seems to be more common in certain parts of the world.

Since the discovery of calcitonin, two other drugs have proved effective in

Plate from Dr. Paget's original article. Patient, aged 68, is shown six months before his death from a "cancerous growth round the radius" (forearm bone). Lower part of plate depicts patient's cap (right) worn in 1844 and hat worn in 1876, measuring inside respectively 22½ inches and 27¼ inches. His hat size grew annually over many years.

Pain Unit

(Concluded from Page 3)

couraging to many patients who have failed to find relief from medication and surgery alone," Dr. Hollister explained.

The average hospital stay is 60 days. At the end of this period, most patients go out the front door feeling much better, capable of doing things they have not done in years, and free of further medication.

But how long does this last? To maintain a feeling of well-being, patients must participate in a program of continuing care.

The pain unit's outpatient agenda includes continuing psychomotor and physical therapy as well as ongoing discussion groups.

"Attracting people to these ambulatory sessions is much more difficult than getting them into this program in the first place," Dr. Hollister said. "Most people won't do it.

"Even after going through all of this, they still say, 'The job is done. I'm feeling great. I've got nothing more to worry about,' which, of course, is wrong. These people can't remake themselves in 60 days. The most anybody can do is get something started."

slowing changes in bone structure. They have certain advantages over calcitonin but cannot match it for safety.

Long used in the treatment of tumors, mithramycin can control calcium release from bones and is much less expensive than calcitonin. Mithramycin, however, has been reported to have toxic effects on the liver, kidneys, and bone marrow and, therefore, has not been approved for treatment of Paget's disease.

Dr. Krane conducted clinical tests on the other effective drug, diphosphonate, which is more effective than calcitonin in reducing biochemical abnormalities, but proper indications for its use are currently being evaluated.

Calcitonin itself has drawbacks. Some patients develop antibodies to the salmon strain, but in these instances human calcitonin, although much less potent, can still be beneficial. Human calcitonin is not yet licensed for general physician use, however.

In a few patients, nausea, flushing of the face, and skin reactions have occurred.

"Extensive evaluations of calcitonin's effect on Paget's disease are continuing. From them, we are learning how to best use this drug in the disease," said Dr. Potts, a Professor of Medicine at Harvard Medical School.

"In view of its high cost, how infrequently can it be given and still do the job? Do patients need it every day or can they get by with it on a twice-a-week basis? Must patients rely on the drug for the rest of their lives? This is the kind of information we're looking for.

At left, man's right leg is bowed by Paget's disease; at right, X-ray view of a second patient's legs beset with same affliction.

"Meanwhile, calcitonin not only offers considerable promise in controlling Paget's disease but it is also being studied for potential therapeutic applications in other areas.

"Calcitonin may have a role in treating certain types of hypercalcemia [excess calcium in the blood] due to increased bone breakdown. The hormone also blocks gastric acid production so that there is interest in whether it may be helpful in treatment of ulcer patients."

Through calcitonin, specialists, using an assay test developed by several centers as well as by Dr. Potts and his associates, can also detect early signs of an inherited thyroid cancer which has a high fatality rate.

"While the tumor is still microscopic," Dr. Potts explained, "its cells are actually forming and releasing increased amounts of calcitonin into the blood. So if you do blood assays for calcitonin, you can detect the presence of the tumor so that it can be removed surgically before it spreads."

At the MGH and other medical centers where calcitonin studies are being conducted, personnel use the calcitonin assay periodically to screen members of families at risk for thyroid cancer.

Surgical Teams Guard Against Rare Fever

A 14-year-old girl entered a Massachusetts hospital for repair of a left elbow fractured in an accident.

Finding her otherwise in excellent health, doctors routinely administered anesthesia and prepared to do the corrective work.

Within 15 minutes, however, the young patient's temperature shot to 105 degrees. An hour later it hovered at 108. The girl's heart beat furiously. For a few moments, her breathing stopped.

Emergency action by the doctors stabilized the patient's condition. Then, after following medical advice obtained from Dr. John F. Ryan, Associate Anesthetist and Director of Pediatric Anesthesia at the MGH, the surgical team made hurried arrangements to transfer the girl to this institution.

Upon arrival at the MGH her temperature had regressed to 100.6. Her pulse also had returned to a nearly normal pace.

After three days of further treatment the young patient was well enough to withstand the surgical repair of her broken elbow. Five days later she was discharged, once again in excellent health.

What was this terrifying condition which had befallen the teen-ager? Its name is malignant hyperthermia. What caused it? The anesthetic.

Six or seven years ago, the chances of survival were only 1 in 10. Today with more doctors aware of the syndrome (group of symptoms) and prepared to counteract it, the mortality rate has fallen to a much lower, but still ominous, 58 percent.

Apparently hereditary, malignant hyperthermia can be triggered by any potent inhalation anesthetic used for more than 10 or 15 minutes.

Fortunately the incidence of the disease is extremely small. While discussing the subject at an MGH medical meeting (Children's Service grand rounds), Dr. Ryan remarked:

"We've had 1 case in 120,000 patients at the Massachusetts General."

Nine malignant hyperthermia patients have come under Dr. Ryan's care thus far in his medical career. On at least three occasions, he has been summoned away from staff duties at the MGH to treat sufferers of the disease elsewhere.

His first exposure to the ailment came at another hospital when the tem-

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Muscle Tests Offer Hyperthermia Clues

(Concluded from Page 5)

perature of a 32-year-old woman rocketed to 112 degrees in less than 20 minutes after removal of her tonsils. This was the highest reading that the thermometer used could register. The woman survived.

"Hyperthermia frequently appears in situations in which the patient was perfectly normal just minutes earlier," the doctor declared. "It can be a terrorizing experience to encounter the syndrome during a simple elective procedure in which no problems at all had been expected."

In about two-thirds of the patients, the affliction strikes during initial exposure to anesthesia. The remaining one-third develop the syndrome during their second, third, or fourth exposures. Adult males appear more susceptible than others.

Of more than 650 instances of malignant hyperthermia recorded at the University of Toronto, an international collection house for the disease, fewer than one-quarter can be described as well-documented.

Preoperative detection of the syndrome by observation alone is virtually impossible, but some common features have emerged from case histories.

"Patients oftentimes will have an increase in muscle bulk," Dr. Ryan explained. "A seven- or eight-year-old child may look, for instance, as though he had spent much time at weight lifting.

"Patients also may have a history of muscle weakness or muscle cramps. They may have a slight temperature that doesn't seem to go away, and they may exhibit ptosis [droopy eyelids] and squints.

"To make a diagnosis before an operation, we really have to go to a muscle biopsy. In 50 percent of the patients susceptible to hyperthermia, we see a decrease in the number of motor neurons [nerve cells dealing with motion] plus an increase in their size. Also in half the patients, we see a slowing in their electromyogram [a record of muscle response to electric stimulation]."

Probably the most helpful test is one involving caffeine. If you put a snippet of muscle into a solution and add caffeine, the tissue of individuals at risk for hyperthermia will contract more rapidly than the tissue of others.

In addition to a rising fever, early signs of developing hyperthermia while under anesthesia are numerous. A patient may have a pulse of 120 and then, over a 15- or 20-minute period, the heartbeat may jump to 180 or 200 per minute (tachycardia).

This is triggered by respiratory and metabolic acidosis (excess acidity in the blood and tissues).

Other symptoms include irregular heartbeats (arrhythmias), a bluish skin tone (cyanosis), mottling of the skin, sweating, and sometimes rigidity.

During the early phases of the syndrome, the liver becomes the "hottest" organ in the body.

To treat malignant hyperthermia, the physician first must halt the anesthetic which, after all, activated the problem. Because of the body's metabolic demands, the patient must have 100 percent oxygen. Forced respiration (hyperventilation) is important.

Other necessary steps:

Treatment to correct the acidosis and arrhythmias.

Reversal of an abnormally high blood potassium level (hyperkalemia).

Cooling to lower the patient's body temperature.

Maintenance of urinary output to avoid the possibility of kidney failure.

Dr. Ryan also told his medical colleagues, assembled for Pediatric Total Patient Care Grand Rounds, that a planned regimen cannot be overemphasized:

"At 2 a.m. when you're performing an appendectomy on a four-year-old, and this hits you, unless you know what you're going to do and can do it all in 15 or 20 minutes, it's all over. You really haven't got time to stop and think, or to telephone people."

After a patient overcomes malignant hyperthermia, he has no need to worry about recurrence unless anesthesia is contemplated again in the future.

"He should wear a medic alert bracelet," Dr. Ryan advised. "He should know about the disease fully, but he shouldn't be terrorized by it. Unless he has anesthesia, he can lead a perfectly normal life."

Dr. Ryan, an Associate Professor of Anesthesia at Harvard Medical School, also recommended that upon facing surgery a person susceptible to hyperthermia should be directed to a medical center which is familiar with this condition and is fully prepared to deal with it should the need arise.

Being tested at the MGH is a disposable, digital skin-temperature monitor for use during surgery. Developed by Ronald S. Newbower, Ph.D.; Jeffrey B. Cooper, Ph.D.; and Dr. Ward R. Maier in the Bioengineering Unit of the MGH Anesthesia Department, the device, in the form of an adhesive-backed strip, is simply applied to the forehead. Each set of numerals on the strip is printed with a liquid crystal sensitive to a different temperature.

By allowing simple monitoring of the temperature of patients undergoing anesthesia, the device could theoretically provide an early warning system to detect a problem such as malignant hyperthermia.

League Aids Patients In Thoughtful Ways

(Concluded from Page 8)

ful work," Mrs. Raker said. "She wants to do more than just pour tea."

Pouring tea, coffee, and juice was, in fact, one of the first services the League provided when it expanded its activities to work with outpatients in the Ambulatory Care Division (clinics). The "hospitality cart" has been taken over by a group of patient volunteers, however, as League members have become more directly involved with patients.

"We keep an eye out for the patient who is hungry, forlorn, or confused," said Mrs. Patricia Ingersoll, active for many years in the clinics. "We may spend an hour listening to a patient who needs to bare his soul, or we may simply help an arthritic patient tie his shoelaces."

The elderly or non-English-speaking ambulatory patient often needs help understanding both the procedures and physical arrangement of the clinics. Among health-care workers the volunteer is one of the few who can be concerned solely with the nonmedical needs of patients and visitors.

Mrs. Ingersoll recalls the bewilderment of a young man who had brought his sister-in-law to the Emergency Ward, left momentarily to park his car, and returned to find her gone. He spoke little English.

The volunteer helped him trace his relative, escorting him from the MGH's Emergency Ward to that of the neighboring Massachusetts Eye and Ear Infirmary to one of their specialty clinics, where a Spanish-speaking staff member explained what was being done for the patient.

"Before he left, the man put a hand on each of my shoulders and, struggling with his English, said, 'I thank you,' " Mrs. Ingersoll said.

The League has assisted in many special programs, such as a massive screening in the '60s of children from Chelsea and Charlestown as part of the Headstart program. In recent years, Service Leaguers have initiated several innovative projects, including an in-service training session for all Ambulatory Care Division volunteers and a new visitor's map of the corridors.

From left, Dr. Dragoslav Mitrovic, a Research Fellow newly arrived from France, gets a lead on housing from Mrs. Florence Hurley and Mrs. Susan Quinby of the Service League.

One of the League's greatest contributions has been the staffing of information desks at strategic locations throughout the MGH. The need for such a service is revealed by records kept at one desk: an inquiry is logged every two minutes.

For hospitalized patients, the League has for years arranged a distinguished series of concerts in the MGH Chapel. Singers and instrumentalists, all artists of professional stature, present 15 free half-hour concerts each season.

Both patients and employees are invited to participate in the annual "MGH Night at the Pops" at Symphony Hall. Any extra receipts from this League-sponsored event are donated to a worthy MGH project.

Service Leaguers can be found taking part in any activity of benefit to the MGH community. They assist in the Bicentennial tours of the hospital, Ether Day celebrations for employees, and the Coffee Shop, which they cofounded in 1964 with the Ladies Visiting Committee.

While many volunteer organizations have lost women to the working force in recent years, the Service League maintains a steady core of dedicated workers. The organization's willingness to "grow with the times," Mrs. Raker believes, and to provide challenges equal to the capabilities of its members makes it attractive to today's woman.

There is often standing room only for the popular Chapel Concerts sponsored by the Service League. Here the Needham English Handbell Ringers give a Christmas performance.

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25 YEARS

A Knack for Making People Feel at Home

One hospital administrator defined it as "giving a nice individuality to the common humanity of the hospital." An Italian physician said it made him "exactly feel at home a thousand miles away."

Each was describing the work of the MGH Service League, a volunteer organization which celebrates its 25th anniversary this year. Founded to assist foreign professionals working or studying at the hospital, it has diversified to provide many thoughtful services to patients and staff alike.

In 1951 a long-established volunteer group, the Ladies Visiting Committee, approached physicians' wives with a special problem: foreign visitors were arriving at the hospital well-versed in their fields but ill-prepared to find suitable housing or make their way around Boston. And their families, isolated by language and cultural differences, were often very unhappy.

To ease the visitors' adjustment, a Staff Wives' Association was formed. Meeting in homes, they planned a series of "get acquainted" events. To establish a housing service, members "walked the streets from Quincy to Wakefield," as one recalls, seeking sympathetic real estate dealers.

The service became so valuable that by 1955 the Reception Center for International Visitors was established at the MGH. Now more than 100 professionals – physicians, technicians, nurses, social service workers – from 35 different countries register each year.

Before they arrive, the visitors are sent a personal letter with tips on getting along in Boston. If the families' requirements are known, apartments may be scouted in advance.

A "Welcome to Boston" kit, a treasure of information about the city, is given to each new arrival at the Reception Center. The families are invited to take a trip to the "furniture barn," where donated items can be borrowed for the duration of the visitors' stay.

Drawing on its talented membership, the Service League provides such services as legal consultation for problems with leases, loans, and the foreigner's status in the U.S.

The Reception Center is the first and perhaps the only one of its kind in a hospital. "We have never heard of a similar service in any hospital in any part of the world," said Mrs. Elda Jane Raker, Service League President, "but we have answered many inquiries about our procedures."

Long-lasting friendships often develop from organized events such as the annual picnic, beach and pool parties, teas, and invitations to family Thanksgiving and Christmas celebrations. Blocks of tickets to the Symphony and to sporting events are also made available to the visitors.

The real beneficiaries of these efforts are the spouses and children of the foreign visitors. Mrs. Dorothea Rodkey, long active in hospitality programs, recalls a Muslim woman, wife of a physician, who was prohibited by strong cultural mores from stepping out of her house unescorted. Because she had no acquaintances in Boston, League members were her only contact with the outside world.

The League has always welcomed as members any persons (including one man) "in sympathy with the goals of the association." To reflect these goals, in 1961 the Staff Wives' Association changed its name to "the MGH Service League."

In 1975 the Distaff Club, wives of house officers (residents and interns), disbanded and were invited to join the League, bringing the latter's membership to 400. The only source of income is the $3.00 annual dues from each member supplemented by voluntary contributions.

As modern technology brings the world closer to a "global village," the foreign visitor has become "better traveled, more adaptable, and less dependent on hospitality," Mrs. Raker said.

The Service League volunteer, too, has changed.

"Today's volunteer demands that her time be compensated by meaning-

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Holding her 7-month-old daughter, Mrs. Solange Denis checks into the Surgical Clinic with the help of Mrs. Edith Palmer, a regular volunteer with the Service League since it was formed 25 years ago.

MGH News

Vol. 35 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1976

Genetic Screening Offers Protection for Newborns

Saving Precious Fingers with Microsurgery

Early one morning last July the doors of the MGH Emergency Ward swung open for a factory worker who had totally or partially severed the four fingers of his right hand.

A call went out immediately to the home of Dr. Peter D. Bunting, Chief Resident in the MGH Plastic Surgical Division, asking him to "report in."

It was 5 a.m., three hours after Roland L. Merrill's hand had become caught by a revolving series of blades in a plastic mixing machine at a factory in Newburyport, Mass. Testing and evaluation followed.

By 7, the 32-year-old patient was on an MGH operating table, and a surgical team headed by Dr. Bunting was beginning what would be a 12-hour attempt to replant the fingers.

Fortunately someone at the Newburyport plant had the presence of mind to place three amputated parts into a plastic bag and then pack the bag in ice, thereby preserving the digits. The victim's index finger was still partially attached.

Assisted by Dr. Douglas J. Mathisen, a first-year resident in general surgery, Dr. Bunting replanted the middle fingers, using delicate microsurgical techniques. Ironically, the index finger, the only digit not completely severed, could not be saved. Its nerves were too badly torn.

The surgeons also elected not to sew back the severed tip of the little finger because the separated part clearly would never regain normal function. The thumb had not been affected.

After less than three weeks of hospitalization Merrill was discharged. Today, the young father of two is back at his old job of mixing plastics.

In addition to resuming his factory duties, Merrill continues to enjoy batting balls to his 10-year-old son and joining with him in games of catch.

As a hobby, Merrill tinkers with his 1969 model automobile. "Recently, I pulled the motor apart," he said, "to have work done on the valves. Later, I helped to put the motor back together." He also does electrical repairs in his home.

In May 1962, an MGH surgical team headed by Dr. Ronald A. Malt, then Chief Resident in Surgery, had written medical history by successfully replanting the totally amputated right arm of a 12-year-old boy (*MGH News,* May 1972). Since then doctors worldwide

(Continued on Page 2)

Manipulating a saltshaker is no problem for Roland Merrill following reattachment of two amputated middle fingers on his right hand.

The parents of a boy born recently at a western Massachusetts hospital may owe their son's life to a slip of paper mailed routinely shortly after his birth to the state Department of Public Health.

Containing a dry spot of the infant's blood, the special filter paper was tested at the State Laboratory Institute in Jamaica Plain for a series of metabolic diseases.

The results of this biochemical screening were positive for one genetic disorder – galactosemia, a condition in which milk cannot be tolerated because of the hereditary absence of a certain enzyme (a protein which promotes a chemical reaction).

Extremely rare, the disease if undetected may cause death in newborns within the first two weeks of life. Those infants who go untreated until several weeks after birth but survive develop liver disease, cataracts, and mental retardation.

The positive galactosemia finding in this Massachusetts infant triggered a fast-moving chain of events:

The laboratory notified Dr. Harvey L. Levy, an MGH neurologist and pediatrician. He is also Assistant Director of Health Services at the State Laboratory Institute where he heads the metabolic disorders unit.

Dr. Levy, in turn, alerted the baby's pediatrician. The infant had been taken home on his third day of life and seemed to be well.

The pediatrician quickly reexamined the baby and found that he now appeared somewhat jaundiced, was slightly inactive, had not shown a normal weight gain, and might have an

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EDITORIAL:

Seconds May Prevent a Lifetime of Woe

A given genetic disorder is fortunately uncommon. That is, a child is unlikely to be born with any particular one of these diseases, such as galactosemia.

Collectively, though, such diseases as galactosemia, cretinism, and phenylketonuria occur with some frequency. If untreated, the infant with this type of illness usually suffers serious problems which often end in his institutionalization. The result may be a suboptimal existence for the child, a psychological burden for the parents, and a major expense to the state.

On a nationwide basis, institutionalization for those youngsters costs many tens of millions of dollars. Therefore from both the viewpoint of emotional and physical suffering and of cost, any program that could prevent the dire symptoms would be most significant.

Such a program already exists. Most of the states screen newborns for one or more genetic disorders. As a page 1 article indicates, Massachusetts now tests for nearly 40 different hereditary problems.

Allowing for the cost of screening and treatment, one still finds a resultant net of $365,000 a year saved in this state. And the scope of the screening programs has enlarged rapidly to the present size from just one disease in 1962.

This increasing ability to detect and treat various conditions preventively requires the cooperation of the public. Blood, including umbilical-cord blood specimens, from newborns is sent to laboratories of the Department of Public Health. The state gives a kit to every mother leaving a hospital with a newborn. When the infant is a few weeks old, the mother can forward a sample of the baby's urine to the state Department of Public Health laboratories. With this tiny urine sample alone the laboratories can detect about 30 different disorders.

The procedure is free to the parents and harmless and painless to the infant. Yet for one reason or another 25 percent of parents never bother mailing the urine specimen. The few seconds necessary are a tiny price for the results – either peace of mind or the prevention of serious problems.

Microsurgery Allows Repair of Thinnest Vessels in Fingers

(Continued from Page 1)

have performed hundreds of replantations with beneficial results. Most have taken place in mainland China.

At first only arm and wrist replantations were performed. As surgical methods employing microscopes were developed, the much more delicate concept of digital replants became practical. *And because the ability to grasp objects is so important to man, the significance of this new endeavor was obvious.*

Since fingers contain vessels as thin as extra fine lead in a mechanical pencil, microsurgery quickly became indispensable in repairing and rejoining veins and arteries as well as nerves and tendons.

"It's not just a case of bringing a microscope in and doing the same kind of operation as before," said Dr. Richard J. Smith, Chief of the Hand Surgery Service in the MGH Department of Orthopaedics. "The instruments have to be used somewhat differently. The types of sutures used also are different."

A nerve, for example, is like a cable with many wires inside. These are nerve fibers. By aligning these fibers properly, the surgeons vastly enhance the opportunity for better restoration of both sensation and motion.

"Microsurgery enables us not only to more readily identify and rejoin these fibers," Dr. Smith said, "but with the visualization possible under the microscope we can also use sutures that are much finer than a hair. The heavier the suture the more adverse reaction takes place."

Some microscopes installed in MGH operating rooms cost as much as $18,000 each. Equipped with special lights, they are also usually two-headed to permit simultaneous viewing by the chief surgeon and an assistant.

The advent of microsurgery has not altered the fact, however, that for every replant attempted, many requests are still rejected.

"Since we began digital replantations at the MGH four years ago, we've only worked on 11 fingers," said Dr. John

Photographs: Pages 1, 3, courtesy of Dr. Peter D. Bunting; pp. 4-8, Joel Salhanick.

P. Remensnyder, Chief of the hospital's Division of Plastic Surgery and Co-director, with Dr. Smith, of the MGH Hand Clinic.

"Of the total, involving five patients, six fingers turned out both viable and functional. That's not bad considering the Chinese report a success rate of about 50 percent, and by success they simply mean survival of the finger."

Since Dr. Robert Corry did the hospital's first digital replantation in 1972, successfully reattaching the middle finger on a woman's right hand, about 50 amputated fingers have been evaluated in the Emergency Ward. Very strict criteria govern decisions on whether to undertake the reconstructive work.

Dr. Michael B. Lewis, a member of the plastic surgical division, developed a formula to aid in finger-replantation decisions.

First, what are the chances of restoring normal function? A finger that is alive but not functioning well can jeopardize the entire hand by interfering with the use of other fingers.

The formula also takes into account the patient's age, how he uses his hands to earn a living, and his understanding of postoperative medical requirements.

"You've got to individualize finger surgery," Dr. Bunting commented. "With the exception of a thumb, single-digit amputations are looked at very closely.

"A pianist may need all of his fingers, but a laborer, for example, who loses even two fingers not critical to his work may be better off without them. With a family to support, he may not be able to stand weeks or months of hospitalization plus multiple procedures that have a built-in complication rate. Without replantations, he'd be back to work in two weeks."

In discussing the need to individualize surgery, Dr. Bunting mentioned the Newburyport patient.

"Although the index finger on his right hand could not be saved," the doctor said, "Merrill did have part of the finger left. We gave him time to decide whether he wanted to keep the stump or have it removed, which would have necessitated narrowing the palm of the hand.

"Although removal would have improved the dexterity and appearance of the hand, Merrill, who is right-handed, elected to keep the stump. For example, he found it useful in holding things or manipulating large buttons."

A separated finger, hand, or arm must always be shortened during a replantation. Tissue destruction a considerable distance from the amputation could preclude repair.

Preparing a digit for replantation may take an hour and a half. Then, even with optical aids, reattaching two arteries, at least two veins, two nerves, and three tendons is a time-consuming task. Each miniature blood vessel requires 40 minutes to an hour's labor.

The continuing development of microsurgical techniques has raised medical interest in replantations of an unusual nature.

Suppose a child were born with fingers missing. Could the baby's toes be removed and sutured to the hands with functional results?

Dr. Smith, an Associate Clinical Professor of Orthopaedic Surgery at Harvard Medical School, related three instances, in England and the United States, in which big toes were replanted to substitute for the amputated thumbs of three adults.

"The results were satisfactory," the doctor remarked, "although several reoperations were required over a one- or two-day period. Obviously this is not a procedure to be carried out willy-nilly, but this type of surgery may be a thing of the future."

In China, surgeons introduced to the MGH's Dr. Malt, the "father of replantations," two patients who had had a foot placed on the opposite leg.

One was involved in a train accident in which his left foot was severed and his left leg and right foot badly injured. Doctors replaced the right foot with the left one. Later, aided by a crutch, the patient was able to walk on the transposed extremity.

The second patient had a somewhat similar experience.

Microsurgery has made possible other phases of physical reconstruction.

"We had one patient," said Dr. Remensnyder, an Assistant Clinical Professor of Surgery at Harvard Medical School, "who had to have part of his esophagus [food-carrying tube] removed because of cancer.

"We sewed a piece of small bowel into the patient's neck, connecting the vessels microsurgically, and were able to restore esophageal continuity. Thus, he could eat normally.

"Using microsurgery, we are able to take a large section of skin and tissue containing small blood vessels and implant the whole thing live elsewhere

After replantation of two severed fingers, Roland Merrill demonstrates he can still handle a writing instrument.

in the body. This procedure has a whole host of applications."

Using special tools under an operating microscope, neurosurgeons can now gently reach and repair areas in the brain at much less risk than before.

Microsurgery might be used someday in reconstructing a clubhand. This is a rare congenital condition in which absence of a bone in the forearm causes a hand to be positioned abnormally.

The fibula, a slender bone at the outer part of the leg, can be implanted into the forearm, but with present procedures it would take months for a normal blood supply to return to the fibula. By then its growth surface would be dead.

If, however, after such a transfer blood vessels entering the fibula could be resewn to assure immediate nourishment of the bone, the fibula could continue to grow and replace the missing forearm part.

Although replantations represent by far the most dramatic examples of microsurgery, this specialty is employed most commonly in repairing general nerve damage. With nerves injured, muscle function becomes limited, sometimes paralyzed. Nerves sutured delicately and precisely have the best opportunity to recover.

Microsurgery offers the best means for the removal of scar tissue surrounding nerves and tendons and for the relief of compression upon a nerve. In addition, to eliminate an injury-produced defect in a nerve, doctors using optical aids may cut away the damaged segment and splice in a portion of a healthy nerve which had an unimportant role in a leg or other part of the body.

Screening Can Detect Almost 40 Illnesses

(Continued from Page 1)

enlarged liver. Rehospitalization was ordered.

Since galactose is a major component of lactose, or milk sugar, the infant was taken off milk and given a special formula called Nutramigen, which provides abundant protein but no milk sugar. When the child continued to do poorly and also developed bleeding problems, administration of antibiotics was begun, and a decision was made to transfer him to the MGH.

Seven days old at his arrival, the infant was continued on antibiotics and the special diet. When the urine culture showed that he had a severe urinary-tract infection resulting from a particular organism, the antibiotics were altered to those most effective against this type of infection. After two weeks he showed no signs of illness. After another week of observation, during which time all cultures were negative, the baby was discharged in good health.

Dr. Levy said if discovery that the infant had galactosemia had come two or three days later, it is possible that no amount of treatment could have saved him. Among other factors, galactosemia reduces resistance to infection.

Massachusetts has screened newborns for metabolic abnormalities since 1962. Starting with phenylketonuria, an inherited disease characterized by mental deficiency, the list has grown steadily to almost 40 disorders. Galactosemia was added in 1964.

Of the inborn errors of metabolism checked by neonatal screening, about 40 percent cause no problems. The remainder can create myriad difficulties with mental retardation high on the list.

On January 12, hypothyroidism, failure of the thyroid gland to produce sufficient hormones for normal growth and metabolism, joined the list in the genetic screening program.

This aspect of the program is under the immediate direction of Dr. Marvin Mitchell, an endocrinologist who is also an Assistant Director of Health Services at the State Laboratory Institute.

Two infants with hypothyroidism have turned up in the first 10,000 tests.

Hypothyroid conditions may stem from an iodine deficiency, misplaced tissue (ectopia), lack of a necessary enzyme (biosynthetic block), or complete absence of thyroid material.

The last problem leads to cretinism, in which a child's physical and mental development is retarded. In adulthood, the cretin is a dwarf with a mentality ranging between mild to moderate retardation.

However, when detected immediately after a baby's birth, cretinism may be altered with proper measures. Growth may become normal, and the outlook for mental development may improve greatly.

"Various forms of treatment begun in early infancy may prevent or at least significantly alter the development of an increasing number of illnesses," said Dr. Levy, an Assistant Professor of Neurology at Harvard Medical School.

"For the therapy to be most beneficial, it must be instituted before the onset of clinical illness and thus at a stage in life when only the biochemical aberrations are present."

Since the inception of the state screening program, the MGH has informally served as the principal referral center for many of the infants discovered to have metabolic problems.

The relationship was stimulated by a close association between Dr. Robert A. MacCready, then director of the state laboratories' diagnostic division, and the late Dr. Mary L. Efron, a renowned MGH clinical and basic researcher in inborn errors of metabolism.

Other physicians active both at the MGH and the state laboratories have fostered this unofficial association.

"We look upon the screening of the infants, the testing at the laboratory, and the care, treatment, and genetic counseling which we do at the MGH as a natural sequence," Dr. Levy said.

He and Dr. Vivian E. Shih, who succeeded Dr. Efron as Director of the MGH Amino Acid Laboratory, travel extensively to talk about the program.

"People ask what you should or should not screen for and, in other respects, what you should or should not do," Dr. Levy remarked, "and we certainly are in an excellent position to answer them because we see both sides of the coin. We don't just see the tests or the children. We see them both."

What Dr. Levy finds most exciting about the program is that "we can look at the sum total of metabolic disorders which cause various diseases and can understand them better. Hopefully, this will lead to improved ways of averting such misfortunes as mental retardation."

Some diseases can be detected in blood; others only in urine.

Dr. Vivian E. Shih, Director of the MGH Amino Acid Laboratory, and Miss Petrana Peneva, Research Technician, study paper "chromatogram" showing generalized symptoms as seen in untreated galactosemia patients.

At left, Miss Miriam M. Carney, Research Technician, prepares special diets for children with metabolic problems. At right, Miss Roseann Mandell, Research Technician, performs an assay on an enzyme in which a deficiency results in maple-syrup urine disease.

Under state law, blood specimens must be taken from a newborn and sent to the state laboratories. Physicians also voluntarily forward umbilical-cord blood samples.

In Massachusetts every mother leaving a hospital with a newborn is provided with a kit enabling her to forward a sample of the baby's urine to the laboratories when the infant is a few weeks old. A voluntary procedure, it has a compliance rate of about 75 percent.

Screening urine specimens entails a technique the late Dr. Efron was instrumental in devising. A method worked out by a Buffalo, N.Y., researcher, Dr. Robert Guthrie, is employed in the blood tests.

Nearly 90,000 infants are checked annually in Massachusetts for metabolic disturbances, and 30 to 35 turn out to have some kind of ailment or malady.

While the wide disparity in numbers seems to offer a measure of safety, Dr. Levy cautioned that the diseases can appear anywhere.

He told of two Massachusetts families, one from Medford and one from Malden, who moved into adjacent homes in nearby Billerica within a month of each other.

The mothers were chatting one day, getting acquainted, and one mentioned that her 3-year-old daughter was receiving care at the MGH for a metabolic ailment called cystathioninemia. The disorder is seen once in every 65,000 screening tests.

Exhibiting deep interest, the neighbor asked a number of questions, then explained her curiosity. Her own 3-year-old daughter was being treated at the MGH for maple-syrup urine disease, a metabolic problem appearing once in every 200,000 tests.

Aside from its human rewards, the statewide program provides undeniable financial savings to Massachusetts.

During fiscal 1972-73, the latest year for which statistics are available, the cost of newborn screening and the consequent treatment for metabolic disorders came to $460,000. The U.S. Public Health Service contributed $160,000 toward the screening expense.

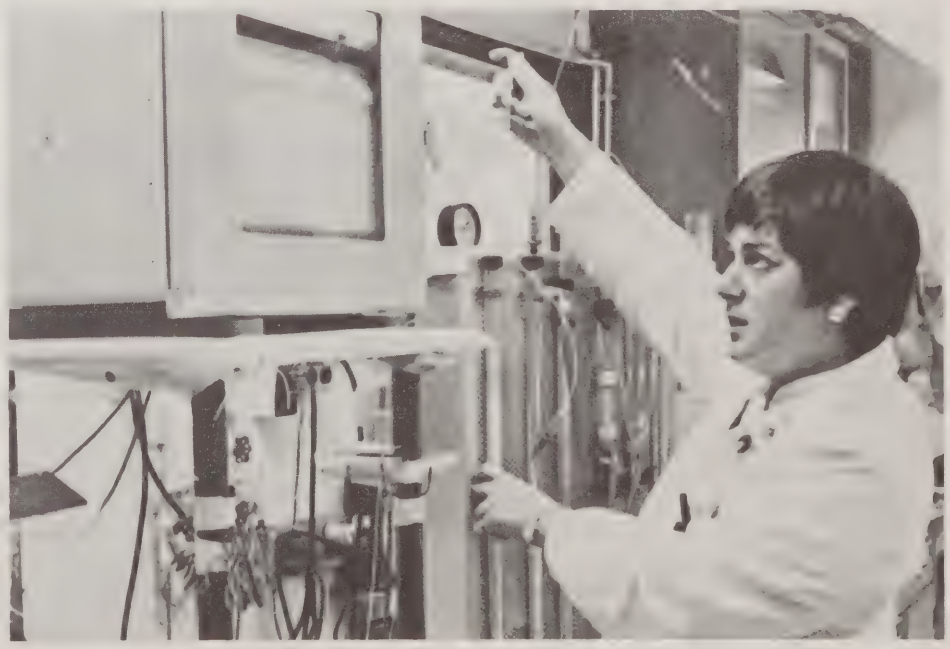
Without this detection arrangement, the cost of evaluating, hospitalizing, and often institutionalizing children with metabolic illnesses would have exceeded $825,000.

An even closer look at the monetary picture reveals that the average expense to treat a child with phenylketonuria (PKU) in fiscal 1972-73 was $1,948.

To provide institutionalized care for mental retardation annually cost $6,840 to $9,861 per person depending on the services.

Seven infants born in Massachusetts during 1972-73 were found to have PKU. Officials estimated that, untreated, four of the seven eventually would have been institutionalized for stays averaging 20 years.

Massachusetts was the first state to conduct PKU screenings. Forty-seven other states have since adopted similar PKU programs.



With the help of an amino-acid analyzer, Miss Evelyn (Evie) Barkin, Research Technician, measures the exact amount of a substance (phenylalanine) in a newborn's blood to assess progress of treatment for phenylketonuria (PKU).

Bright Children Must Experience Challenge

Every Saturday afternoon in London some 150 children ranging in age from 7 to 14 converge on a special school "to learn how to fail."

In other cities across England, Wales, Scotland, and Northern Ireland, similar scenes unfold regularly.

The ability to know failure as well as success is one of education's greatest benefits.

But for the so-called gifted child, the boy or girl blessed with superior intellect, ordinary schooling often leads in only one direction, to scholastic success. This can be diluted by frustrations, boredom, and loneliness.

Speaking recently at an MGH medical meeting (Children's Service grand rounds), the director of a private British organization told how his group strives to prevent this mental and emotional instability.

Henry Collis, Director of the United Kingdom's National Association for Gifted Children, said that when young scholars compete in an environment of their own, even for only a few hours weekly, they learn that while they are unusual they are not unique.

"A boy may beat everyone at his school in chess, including his headmaster. Then he may be beaten at one of our gatherings by a girl a year younger, thus experiencing a real challenge for the very first time in his life," Collis remarked.

At special classes conducted by the association's branches, the gifted youngsters also are exposed to such subjects as computer programming, philosophy, engineering, art, Esperanto, ecology, and shorthand. One branch even schedules a course in Chinese calligraphy (fine handwriting).

The first task of the National Association after its founding 10 years ago was to bring together the parents of intellectually advanced children.

"One of the absolute anomalies of the situation is that the further down the social scale you reach the more resistance you find from parents in acknowledging that their child is in the gifted category," Collis explained. "They are very afraid of what their neighbors will say. They're afraid of how the child will be treated at school.

"He can be brilliant on the football field or as an artist or musician and be much admired, but when he's looked upon as an egghead, the reaction can be very different."

Bringing these parents together gives them a great immediate feeling of support.

How is a gifted child recognized? Parental comments often provide an indication. "He was never a baby," they might say, or, "He's a Houdini incarnate. No strap will hold him."

In art, the typical child may draw a circle for a head, add a couple of things for ears, and extend a few lines for body, arms, and legs. From the age of perhaps 2, the gifted child may put in fingernails, brushed hair, ties, and buttons.

The advanced youngster asks questions incessantly, such as a child under 2 who inquired of his father, "What's in the moon?" Or a 5-year-old who asked her father and mother very searchingly, "How do parents know that they're always right?"

The tot with enhanced natural ability seldom begins speaking by uttering a single word at a time. He usually strings several words together.

"I heard of a boy who didn't talk at a year, or 18 months, or 2 years, or 3," Collis told the assembled MGH doctors, "but at 3 years and 3 months he started talking perfectly, and within a week he read perfectly."

Collis, a former preparatory school headmaster, said gifted children can be very lonely in school, far more lonely than the physically or mentally handicapped.

"They sometimes withdraw into themselves and live in a fantasy world," he said. "They can feel that they are very much on their own and that others are extraordinarily stupid. It's a kind of intellectual arrogance. It doesn't happen very often, but you can meet it. That's why it's so important to bring these youngsters together."

A quarter or a third of the children helped by Collis' organization are troubled by short sleep spans. Equipped with incredible imaginations, they may experience morbid fantasies during the day and then fight sleep to avoid a recurrence of these fantasies at night. They may read a lot to remain awake.

A child far ahead of his classmates doesn't always belong with older youngsters who may be his intellectual equal.

"You can run into the gravest risk of social dislocation if you do that," Collis warned. "I know of one boy of 7 who was brilliant with figures. He was put up with 9-year-olds, and during the first 6 weeks of that term, he developed an incurable stammer requiring him to be put down again. He's now a man of 33, still brilliant in mathematics, but he's lost the ability to communicate easily."

To learn more about giftedness, the National Association studied 11,000 case histories in its files. In two-thirds of the records, signs of above-normal ability were noticed either in the parents or grandparents. In the remaining one-third, no genetic clues could be gleaned at all.

It is in the latter group, Collis said, that the serious problems arise because these are the parents who have the most difficulty communicating with their gifted children. The youngsters encounter much more frustration and a more sterile life.

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MGH's Warren Library provides a wealth of reading material to help a child improve his mind. Young patient, awaiting discharge, keeps himself occupied by poring through the pages of a world atlas.

Long Used Heart Aid Can Help Alleviate Certain Tremors

(Concluded from Page 8)

times is prescribed in combination with L-Dopa.

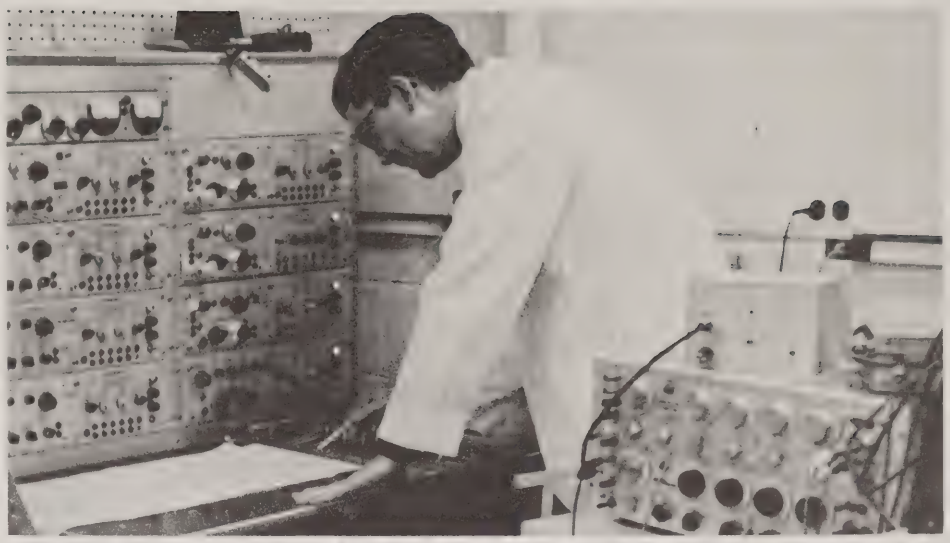
"We have no cure for Parkinson's disease, and there isn't any one medicine that improves all of the symptoms of the malady," Dr. Young stated. "Sinemet comes pretty close but, still, it's important to treat the symptoms individually.

"Different drugs can be needed, depending upon what bothers a particular patient the most."

Thus a medicine used for a number of years in the treatment of cardiac arrhythmias and other heart conditions dramatically reduces so-called action tremors.

In contrast to a trembling of muscles that are at rest, action tremors occur when, for instance, a patient extends his hand, tries to write, or carries a cup of coffee. This condition is not restricted to Parkinson patients.

The effectiveness of propranolol (known commercially as Inderal) against action tremors was first demonstrated to the medical world by Dr. Young and Dr. Gerald F. Winkler, another MGH neurologist.



Dr. Robert R. Young, MGH neurologist, checks result of tremor polygraph test to determine the size and speed of tremors in a Parkinson patient.

Such tremors can be made worse by L-Dopa, but when prescribed in conjunction with propranolol, the L-Dopa does not cause this undesirable effect.

Parkinson's disease is often mistaken for other sicknesses. Most people who take large doses of any of the major tranquilizers for a long period will acquire a parkinsonian appearance.

"I call that Parkinson's syndrome," Dr. Young remarked, "because although the condition looks very much like Parkinson's disease, we know its cause, namely one of the drugs. Stop the drug, and the symptoms will gradually vanish."

Parkinson's disease is named for an English physician, Dr. James Parkinson, who first described it in the early 19th century. The disorder drew little attention in this country until the 1920s when an epidemic of sleeping sickness (encephalitis) was accompanied by a major increase in incidence of parkinsonism.

Since that time, the incidence has continued to mount. The late Dr. Schwab theorized with others at the MGH that older patients just developing the disease might have carried a dormant infection acquired during the epidemic.

Dr. Schwab devised a number of simple but quantitative tests to learn more about the disease. He would ask patients to do things they had practiced all their lives but now could do only very slowly. By timing such actions as donning their socks and shoes or writing their name and address, he could judge how well they were responding to experimental medications.

Considerable research on Parkinson's disease continues at the MGH. "We test new drugs all the time," said Dr. Young, an Associate Professor of Neurology at Harvard Medical School. "So far none has proved to be as useful as L-Dopa. Most of them have too many side effects.

"We're also working on new drugs to help tremors, including those involved in conditions other than parkinsonism."

In addition, work goes forward to answer such questions as: "What causes the disease?" and "At what age are people most susceptible to it?"

The MGH Parkinson Fund, originated over 20 years ago by Dr. Schwab, underwrites a large part of the expenses.

Some 300 Parkinson patients are seen annually, either in the clinic held Tuesday mornings or privately by one of the neurologists.

Often the patients coming to the MGH from many parts of the world make repeat visits during the year.

Gifted Child

(Concluded from Page 6)

Last year from September 8-12 at the Royal College of Surgeons in London, Collis organized and directed the first world conference on gifted children.

An outgrowth of that conference, attended by 500 delegates from 55 countries, is a book, *Gifted Children – Looking to Their Future,* edited by Joy Gibson and Prue Chennells. It is published by Latimer New Dimensions, Ltd., London.

The second world conference will be held in San Francisco in July 1977.

In the United States, an estimated 2.5 million children of superior intellect are enrolled in schools, and about 5 or 10 percent have problems of one kind or another. Collis said the percentage of those maladjusted in Britain is about the same.

To develop the potential of America's bright young children, the U.S. Department of Health, Education, and Welfare allocates special funds to the states to bring enrichment programs into school systems, and it also operates leadership training centers.

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Improved Treatment for Parkinson's Disease

Embarrassed by progressive weakness and the loss of the commanding presence he once enjoyed as he entered a room, the president of a well-known university decided to retire.

Although only in his 60s, he felt unable to carry on his administrative duties. He had lost his vigor. His voice no longer rang with authority. He had become ashamed of his physical appearance.

The educator was suffering from Parkinson's disease, or "shaking palsy." A nervous system disorder, it can impair a person's ability to dress, walk, write, cut meat, even turn over in bed.

Over one million Americans from middle to advanced years are affected. Each year, the case load grows by another 50,000. The cause of the affliction is unknown.

After turning to the MGH Parkinson Clinic for help, the former university head gradually regained his strength. He has not returned to the helm of his school but is now teaching in a college and also is writing a book. Once again he is extremely active.

His comeback is attributed to a drug called Sinemet which only months ago became available for general physician use. A pioneer in Parkinson research, the MGH was the first medical center in New England and one of the first in the nation to demonstrate the value and safety of Sinemet.

The new medication represents a combination of two drugs: L-Dopa (short for levo-dihydroxyphenylalanine), used effectively for Parkinson's disease during the past eight years, and Carbidopa, an inhibiting agent.

The late Dr. Robert S. Schwab, founder and first director of the MGH Parkinson Clinic, was one of the first to use L-Dopa.

To this day L-Dopa remains the most efficient substance produced for the treatment of the disease. Taken alone, however, the drug has unpleasant aspects as well as favorable ones.

The brain uses L-Dopa to make up the deficiency of a substance (dopamine) required for the transmittal of certain impulses. Employed by itself, however, L-Dopa must be consumed in extremely large amounts. This is because much of it is destroyed in the stomach and intestines while en route to the brain.

Using the customary daily dosages measured in grams instead of milligrams (one 1,000th of a gram) creates such problems as upset stomach, nausea, vomiting, loss of appetite, and lightheadedness.

Combined with L-Dopa in the pill called Sinemet, Carbidopa minimizes the destruction of L-Dopa so that more of the latter reaches the brain. Instead of taking large quantities of L-Dopa, a patient can achieve the same result by substituting one-fifth or one-quarter of the drug when combined with Carbidopa.

At just about the time L-Dopa burst onto the scene in 1968, MGH researchers discovered that another drug helped in the treatment of parkinsonism.

"The drug, amantadine hydrochloride, originally was designed to prevent Asian flu," said Dr. Robert R. Young, an MGH neurologist and Director of the Parkinson Clinic.

"A woman patient with Parkinson's disease told doctors here that she had taken amantadine to avoid the flu and that, to her surprise, the drug helped to control her tremors and other symptoms of her ailment."

Research confirmed the value of amantadine, and it later was made available commercially as Symmetrel.

"Although it has fewer unpleasant side effects than L-Dopa," Dr. Young commented, "the usefulness of Symmetrel seems to diminish in some patients after a pronounced initial effect. A month or two later, the patient may be only a little better than before."

Symmetrel, however, is still considered an important drug in the treatment of Parkinson's disease and at

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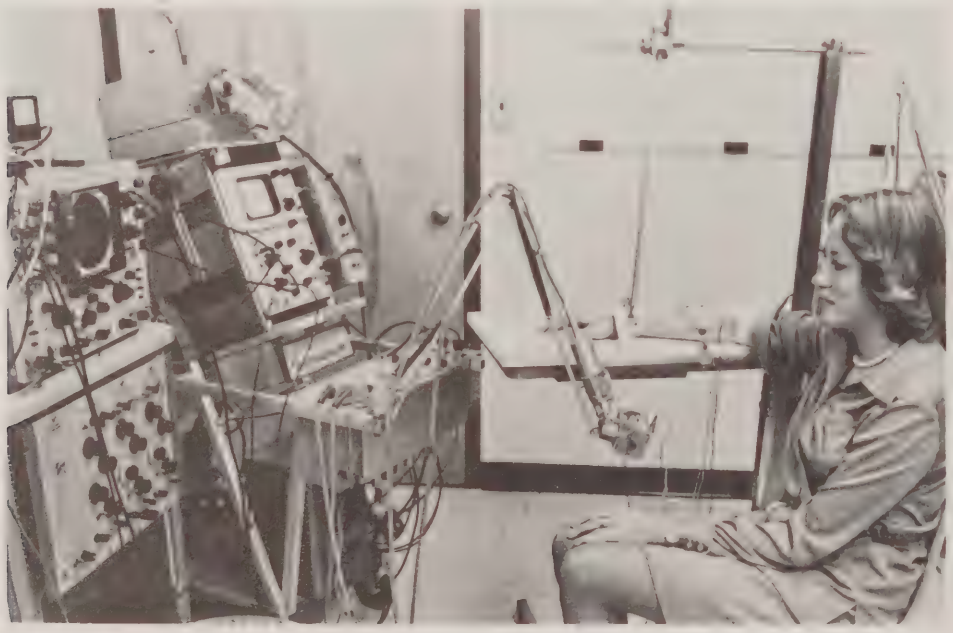

Miss Penny Demarest, secretary in Electromyography (EMG) Laboratory, demonstrates how special electronic recorder would be used to measure the reaction time, velocity, and precision of voluntary movements in a patient with Parkinson's disease.

MGH News

Vol. 35 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1976

Conquering Strokes Depends on Timely Treatment

Cancer Attack Team Gains Added Punch

The three specialties which lead the MGH's all-out attack on cancer are being further unified at the hospital's new multimillion dollar Cox Center for cancer treatment and research.

Dr. Thomas P. Stossel, who trained at the MGH less than a decade ago, will return this month to become Chief of Medical Oncology (tumor medicine).

Medical oncology combats cancer with drugs (chemotherapy), utilized either alone or in combination with surgery or radiation medicine, the other major forms of anticancer treatment.

"In past years, the role of the chemotherapist was largely one of palliation, trying to keep tumors from growing fast," Dr. Stossel remarked. "Today, chemotherapy can bring about long remissions [symptomless or symptom-reduced periods] and even possible 'cures' in a number of tumors.

"With new drugs, certain kinds of leukemia in children can now be treated with more than 50 percent of the patients showing complete recovery. Tumors such as Hodgkin's disease, which originate in the lymphoid system, important to the body's immune defenses, often will respond well to drug treatment.

"New drugs must be found, developed, and tested. By trying new combinations, I think we'll see a very rapid improvement in many diseases that are not particularly responsive now to medication.

"Cancer of the ovary is a good example of what might be helped one day by chemotherapy. This type of cancer is very difficult to detect early. Since it often has already spread when found, it then cannot be cured surgically. And it has not responded well to radiation. This poses a great challenge for chemotherapy."

A new approach called adjuvant chemotherapy shows promise when employed during early development of breast cancer. Several teams have shown that following surgical removal of a breast tumor, certain drugs appear to halt the growth of other possible tumors not yet large enough for detection.

Instances such as this demonstrate the necessity of a many-sided approach

(Concluded on Page 5)

Up. Up. Up. Powerful 35-million-electron-volt linear accelerator is hoisted into new Cox Center for use by radiation therapists in combatting deep-seated tumors.

In medical parlance, a stroke – damage to the brain from a ruptured or blocked artery – is also a cerebrovascular accident.

But, increasingly, doctors are conceding that not all strokes can properly be categorized as accidents.

A succession of warning signals often precedes strokes, which annually befall 500,000 Americans, 40 percent fatally.

The trouble is that the signs usually go unrecognized and therefore unheeded by potential victims.

Frequently, a stroke, the third most common cause of death in this country, can be prevented, lessened, and even reversed. But time is critical. If a patient in the throes of a stroke goes 24 hours or longer without proper treatment, the fight may already be lost.

Dr. Juan M. Taveras, MGH Chief of Radiology and Director of the hospital's Stroke Center, said about 20 percent of people over 55 have some disease in the carotid arteries (the two principal large arteries in the neck).

"Those in this age group may have no symptoms," the doctor pointed out, "but the chances are already one in five that they have some trouble which could lead to a stroke. So when there is any kind of warning, immediate medical attention is called for.

"In younger people, the incidence of strokes is smaller, but it is important to bear in mind that they can happen at any age."

From both clinical and laboratory investigations in the MGH Stroke Center, doctors and technicians have compiled a wealth of knowledge about the affliction whose mortality rate is ex-

(Continued on Page 2)

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Strokes – The Not-So-Hopeless Problem

The word "stroke" has a frightening ring to it. People often think of a stroke as a death sentence or as a sentence to a living death. That is an unnecessarily gloomy viewpoint. In the first place, many strokes are minor, causing little or no harm. Even the more severe variety produces injuries which, though serious, lend themselves to significant improvements through a rehabilitation program.

Nevertheless, most persons – including many physicians – tend to think of strokes as inevitable. Someone with narrowing of neck and brain arteries will eventually suffer a stroke. Or will he? A page 1 article describes two procedures that offer hope to more and more patients.

In one, surgeons remove obstructions, such as blood clots, from arteries leading to the brain. In a more recent technique, surgeons at two institutions have developed a way of bypassing clogged arteries. This method is being used at only a comparatively few hospitals around the country. While the number of patients operated on has been rather small to date, the technique is likely to spread to most teaching institutions and offers a way to prevent strokes in those who heed their early symptoms.

Completing a Leg of Cancer's Triad

Surgery and radiotherapy are the two major original ways of fighting cancer. In recent years, however, drugs (chemotherapy) have found increasing use. In addition, the allied field of immunotherapy, a means of awakening the body's natural defense mechanisms against disease, has shown growing promise as a cancer-fighting tool of the future. Research into immunotherapy is being conducted by a physician newly appointed to the MGH. He is Dr. Thomas P. Stossel, who has become the Chief of Medical Oncology. In this role Dr. Stossel will coordinate the physicians who use chemotherapy and immunotherapy to treat cancer. He will also continue his own research. His appointment will help complete the third leg of the tripod of surgery, radiotherapy, and medical oncology at the hospital's new Cox Center.

* * *

The experience of MGH psychiatrists indicates that the psychological reaction of cancer patients is much less negative than expected. In a page 4 article Dr. Avery D. Weisman found that most such patients cope well with the truth. His team's research may one day prove as useful in the psychological adjustment to cancer as are the biological studies to the treatment and cure of various forms of cancer.

Reduced Blood Flow May Lead to Stroke

(Continued from Page 1)

ceeded only by heart disease and cancer.

Hopefully, the data gathered by the Center will lead to ways of slowing the course of strokes. This slackening would provide precious time for medicine and surgery to do their part.

"Before we see a stroke patient, a bit of his brain tissue has already been damaged beyond repair," Dr. Taveras stated. "Our job then is to limit the damage. With time on our side, we can do that.

"The Stroke Center is an interdepartmental effort involving neurology, neurosurgery, neuroradiology, and to a certain extent the Medical Service.

"This interdisciplinary teamwork is essential in the management of strokes. We must know quickly just what kind of stroke is involved so the method of treatment, either by medicine or surgery, can be determined."

The medical practitioner still mans the first line of defense against this condition. Cognizant of the risk factors such as high blood pressure, elevated cholesterol, hardening of the arteries, and diabetes, he can detect and treat such abnormalities effectively.

Dr. Jay P. Mohr, coordinator of the clinical Stroke Service, points out that the first warning signs of an impending stroke are often periods of reduced blood flow to the brain. Called transient ischemic attacks (TIAs), these spells temporarily produce dizziness, loss of vision in one eye, weakness or paralysis in an arm, leg, or the face, or difficulty with speech.

Few TIAs last more than one hour. The majority terminate in less than 15 minutes. However, the attacks recur with varying rapidity, sometimes once every three months, once a day, or even 100 times daily.

Of those who have experienced a major stroke, 80 percent have a history of transient ischemic attacks, or "little strokes."

Dr. Robert M. Crowell, an MGH neurosurgeon, spoke of a 63-year-old Cape Cod resident who entered a hospital complaining of difficulties with speech and loss of strength in his right hand. After consulting with Dr. Crowell, the hospital transferred the patient to the MGH.

By the time the ambulance pulled up outside the Emergency Ward, the man was having a major stroke. He lost his speech completely, and the right side of his body became totally paralyzed.

"An angiogram [an X ray of blood vessels after injection of a substance to show them] disclosed a blockage in the neck," Dr. Crowell related. "At surgery, we were able to remove this blockage and restore a normal blood flow. Almost immediately in the recovery room, the patient to some degree was able to move and speak. He has since gone on to make a 95 percent recovery.

"We caught him in time. If he had not been treated as promptly as he was, I'm sure he would be institutionalized today."

Normally after TIAs tag an individual as stroke-prone, a battery of noninvasive (external) tests is ordered. All are performed without discomfort or risk to the patient.

One test called phonoangiography, developed fairly recently by the MGH and M.I.T., involves use of special equipment to listen to sounds made by blood flowing through an abnormal carotid artery.

Another test called directional Doppler ultrasonography monitors the direction of blood flow in and around the eye sockets.

Still another device studies the face, using heat sensors to search out "hot" and "cold" areas. A branch of the brain's main artery courses close to the skin's surface just above an eyebrow. If the blood flow in this offshoot changes, so does the temperature.

Dr. Julie L. Heston, Senior Resident in Neurology, ministers to elderly patient under treatment for an aneurysm, an outpouching in a weakened blood vessel which sometimes precedes a stroke.

"If these tests unveiled a problem," said Dr. Crowell, "the next step would be angiography. Although invasive, it is a very effective test because with a picture of the flow in the blood vessels, we can spot any blockages, narrowings, or ulcerations in them.

"Assuming that an obstruction were found, we might employ anticoagulants [blood thinners] to keep blood moving to the brain, or we might turn to surgery."

Dr. Taveras remarked that frequently just a narrowing in a carotid artery, rather than total obstruction, will lead to a stroke.

"Small clots can form in these narrowed areas, then break free and travel in the bloodstream to obstruct a vessel within the brain itself," he said.

An operation to "clean out" arteries in the neck has been very helpful in preventing and reversing strokes. This was the procedure followed in treating the patient from Cape Cod.

More recently, methods of detouring clogged cerebral arteries have evolved. Using techniques possible only under a microscope, surgeons can create a new blood supply by constructing from scalp arteries bypasses extending from neck vessels directly to the brain.

The results of 10 such bypass grafts performed at the MGH by Dr. Crowell indicate promise for this new type of surgery. None of the 10 patients suffered a subsequent attack in the repaired area, although 1 had a stroke on the other side of the head. This was unrelated to the surgery.

The bypass procedure was developed in the mid-1960s by two surgeons, Dr. R.M.P. Donaghy of the University of Vermont College of Medicine in Burlington, a former resident in neurology and neuropathology at the MGH; and Dr. M. Gazi Yasargil of the University of Zurich.

Dr. Crowell spent a year in Switzerland studying the method under Dr.

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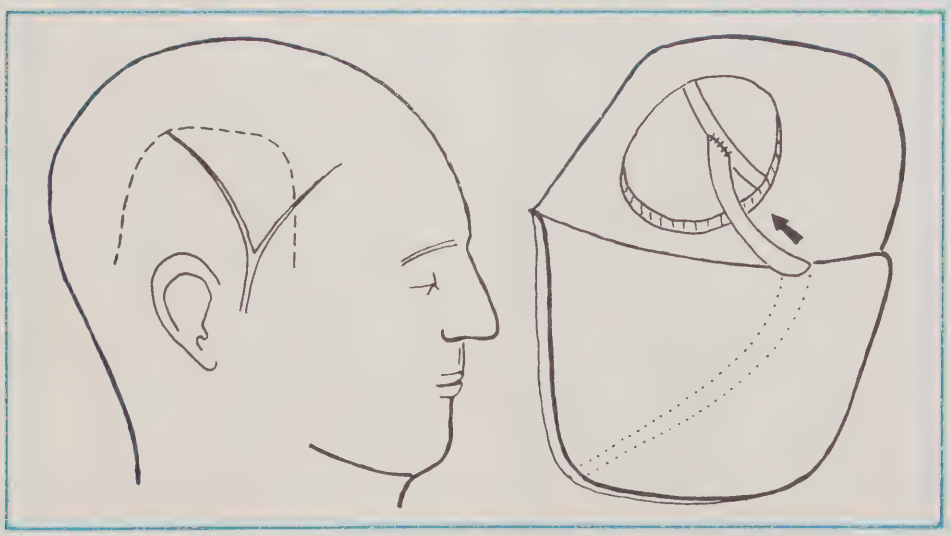


Brain artery bypass involves use of scalp artery (left sketch). After skin is folded back (right), exposing the blood vessel, an opening is made in the skull (craniectomy). One branch of the scalp artery is passed into the skull and connected to a brain artery, thus creating a new blood supply for the brain.

Photographs: Pages 1, 3 (upper), Mary M. Hoffmann; p. 4, Robert Crivello; p. 5, courtesy of Dr. Thomas P. Stossel; p. 6, Joel Salhanick; p. 7, Stanley Bennett; p. 8, MGH Archives. Drawings on p. 3, courtesy of Dr. Robert M. Crowell.

Contending With a Diagnosis of Cancer

How does a person react to the disclosure that he or she has cancer?

An MGH psychiatrist who has spent years studying the psychological aspects of terminal illness gave this answer:

"Regardless of the frightening impact that cancer has, most patients, if not the vast majority, come to terms with it. They cope surprisingly well with their plight."

At an MGH medical meeting (Psychiatric Grand Rounds), the psychiatrist, Dr. Avery D. Weisman, talked about reaction to cancer.

"In our discussions," he told the assembled doctors, "we may talk about prognosis, but it's rare to have a patient in the preterminal phase ask, 'How long will I live?' "

When a psychiatrist is called upon to confer with a hospitalized MGH cancer patient, an attempt is made at the outset to learn what the patient knows about his condition.

"Most cancer patients know what they have," said Dr. Weisman, "but rather than say 'cancer' they may say they have 'a mass' or 'a tumor.' Those who do not want to know will make their physicians well aware of their preference.

"Of the informed, less than five percent will insist later that they are still in the dark about the diagnosis."

Are there reasons which dictate against revealing the truth to a patient? Dr. Weisman does not know of any.

"I feel that an informed patient is a better patient," he said. "It seems to me that if you begin with a lie or deception, then you're committed to lying. Whatever distress that people experience may be related to the way something is told rather than what is told.

"Since 1968 I've only come across 8 to 10 patients who attempted suicide in connection with cancer. Four of the instances took place during a remission [a period when symptoms disappear or abate]. Suicide attempts by people with cancer are exceedingly rare and may not even then be related to cancer."

For the past eight years Dr. Weisman has served as Principal Investigator of Project Omega (*MGH News,* June-August 1970), an MGH program of research into both suicide and terminal illness. Originally funded by the National Institute of Mental Health, the project is now financed by the National Cancer Institute.

In connection with his studies, he has written numerous papers, such as "The Dying Patient," "The Psychiatrist and the Inexorable," "Early Diagnosis of Vulnerability in Cancer Patients," and "The Existential Plight in Cancer – Significance of the First 100 Days," the latter in collaboration with Dr. J. William Worden, MGH psychologist.

To underscore his view that most cancer patients cope well with knowledge of their affliction, Dr. Weisman mentioned a woman who spoke several years ago at a surgical grand rounds in another hospital. Her remarks later formed the basis of a guest editorial in *CA – A Cancer Journal for Clinicians,* published by the American Cancer Society.

Dr. Weisman excerpted from the editorial entitled "Every Day Is Precious":

"I'm a patient who has lived with active cancer for a little over two years. I've been through most of the available treatment. I know my chances of living out my life span are not great.

"What I want to impress upon you is that whether I live two years or 20, every day is precious to me. I want to be encouraged to live each day.

"You have no idea how often I've seen pity and guilt on the faces of doctors. Sometimes I'm even tempted to put my arms around them and reassure them that for the time being I'm managing."

Dr. Weisman said the patient spoke of her relationship with various physicians and how important the personal contact was because she felt particularly frightened and mortal.

At the start of her hospitalization, a resident asked what he could do for her. She begged the doctor to tell her what was likely to occur. Quietly, he explained what she might expect if malignancy were found, what discomfort she would have, and how long she would be in the hospital. Then he "exaggerated" her chances for survival, a white lie which, the patient agreed, was appropriate at the time.

She found the resident's talk a lot less frightening than fantasies which had been racing through her mind, and it calmed her down considerably.

"Believe me," she said, "the unknown is much more frightening to a patient than a quiet, logical explanation."

She made the young doctor promise never to say, "It's nothing," or "Don't worry," unless he followed it up with a "because."

"If you tell your patients lies with the intention of protecting them, and they suspect things are not as you say," she cautioned, "all the 'don't worry's' and 'it's nothing's' won't mean a thing.

"By being prepared for the worst, I was happy to accept that it wasn't so bad.

"This may seem like a lousy life to you, but life is precious so long as one can function, and when one is facing death, any time is a marvelously

(Concluded on bottom of Page 5)

Dr. Rita M. Kelley, left, chats with one of her patients receiving chemotherapy treatment from Miss Frances Mitchell, RN, in the Cox Center.

Cancer Specialists Confer on Treatments

(Concluded from Page 1)

to treating cancer.

The decision on the role of each method requires consultation and complete cooperation among the three cancer-attacking specialties.

"Since the patient often goes to the internist first because something hurts, or he's got some kind of lump that worries him, the medical oncologist might find himself steering the proceedings," Dr. Stossel remarked.

"He would arrange to have the surgical oncologist do a biopsy, then get from the pathologist the findings on whether the tissue examined is benign or malignant.

"If it is malignant, representatives of each specialty, the medical and surgical oncologists and the radiation therapist, would get together, study the problem, and decide what course of treatment would be most appropriate."

A graduate of Princeton University, summa cum laude, and Harvard Medical School, cum laude, and a former MGH intern and resident, Dr. Stossel returns to the MGH after serving since 1972 as an Associate in Medicine (hematology) at Children's Hospital.

He is also a Senior Clinical Associate at the Sidney Farber Cancer Center in Boston and an Associate Professor of Medicine at Harvard Medical School.

Dr. Rita M. Kelley has been serving as Acting Chief of the Medical Oncology Unit at the MGH. As a hospital committee conducted a nationwide search for a permanent Chief, Dr. Kelley suggested that the nominee should be a "youngish person, most of whose career is still ahead, who is now working on one of the frontiers of cancer care – immunology, virology, or genetics, for example."

In his new role, Dr. Stossel, who is 35, will coordinate the activities of a small but growing group of MGH Medical Service physicians who specialize in the study and treatment of tumors.

In addition, he plans to devote considerable time to the training of more physicians as medical oncologists and to press ahead with research in a field which looms as a potentially powerful fourth front against cancer.

Immunotherapy, use of the body's natural defenses against disease, offers a number of interesting possibilities as an anticancer weapon. Dr. Stossel brings to the MGH extensive research experience in one particular aspect of immunotherapy – a process called phagocytosis.

A phagocyte is a form of white cell in the blood. Its mission, like that of all white cells, is to defend the body against harmful agents, such as certain bacteria and organisms that carry disease.

"Phagocytes knock out pathogens [disease-causing substances] by consuming them," Dr. Stossel explained. "The question we'd like answered is whether phagocytes can be made to recognize and attack a tumor cell because, after all, such cells do represent something that is not normal.

"We're also looking for ways to prevent cancer patients from developing secondary infections. The chemotherapy treatments kill not only cancer cells but healthy cells, such as phagocytes, which aid the body's defense."

In addition, Dr. Stossel's investigations deal with the basic mechanism of how cells move about. "One of the curious things about cancer cells," he said, "is that they don't stay in any one place. They grow in an uncontrolled way and then crawl around. If we can learn how they manage to move, we might be able to develop ways of altering that mechanism."

Since 1966, the young physician from Belmont, Mass., has published or presented some 75 papers on his research. Most of them dealt with phagocytes, which he began studying during a two-year association with the National Institutes of Health in Bethesda, Md.

Although the specialties which focus most closely on cancer have the same mission, their structural setups within the Cox Center differ.

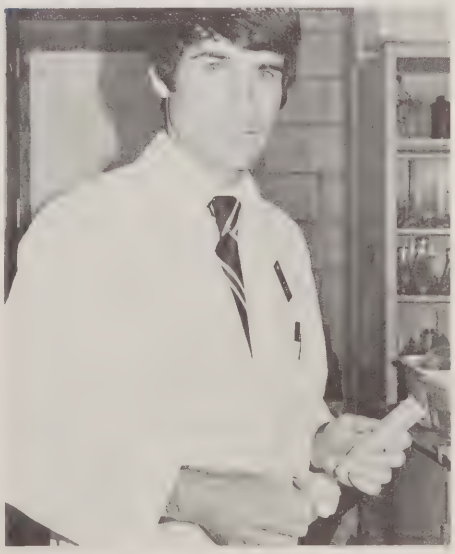
Dr. Howard Ulfelder, Deputy to the MGH General Director for Cancer Affairs and administrative supervisor of the Cox Center, said of the variation:

"The hospital's entire Department of Radiation Medicine, directed by Dr. Herman D. Suit, is based in the Cox building. On the other hand, the Medical Oncology Unit, under Dr. Stossel, represents a very small, although highly visible, segment of the Medical Service, directed by Dr. Alexander Leaf.

"As for Surgical Oncology, Drs. William C. Wood and Alfred M. Cohen, who trained in oncology at the National Cancer Institute, have moved into the Cox building to work in that field primarily."

"The active participation of surgeons in laboratory cancer research is becoming more and more characteristic of the field," Dr. Charles A. Sanders, General Director, said.

"While many surgeons throughout the hospital are involved in cancer treatment, the juxtaposition of specialists in cancer surgery and medical oncologists in the Cox Center represents a partnership between medicine and surgery which in some ways is unique. And with the radiotherapy team just a floor away, the patients get the maximum benefit of all three of these forms of treatment."



Dr. Thomas P. Stossel

Appointed MGH Chief of Medical Oncology

Reaction to Cancer

(Concluded from Page 4)

long time."

Dr. Weisman, an Associate Professor of Psychiatry at Harvard Medical School, said a principal role of the psychiatrist in confronting cancer patients is to "cool them off."

"The cooling-off can refer to anxiety, depression, anger, or other emotions," he told the MGH gathering at nearby Lindemann Mental Health Center. "Then, gently and tactfully, correct the misconceptions and make an effort to contain the conflict."

By containment, Dr. Weisman explained that he meant things should be defined in as positive a manner as is compatible with reality.

"It's always a source of surprise to me," he said, "that just being there, being available, and keeping your own cool can make a difference."

Most Strokes Follow Prolonged Disorders

(Concluded from Page 3)

Yasargil and performed his first bypass at the MGH in 1970. Today, an estimated 20 neurosurgeons do the bypass in this country, including several in New England.

Strokes fall into two general classifications:

- An occlusion. A clot plugs the interior of an artery, cutting off blood to the brain.
- A hemorrhage. An artery breaks, causing blood to escape into tissue.

A hemorrhage may result from an aneurysm, an outpouching in a weakened part of a blood vessel usually located in the neck.

"These hemorrhages are sometimes of a mild type, enough to give a severe headache and stiff neck but not enough to paralyze or cripple," Dr. Crowell remarked. "If the difficulty is detected at this point, tests can indicate where the problem lies, and a surgeon can put a clip on the aneurysm.

"Ten years ago, this was a dangerous operation. Today, however, using microsurgery [*MGH News,* May 1976], it's possible to get in very gently and take care of the problem before it can become very serious. Again, time is so critical."

Seventy percent of strokes are the occlusive type. Most commonly, they result from progressive blood-vessel disorders existing for years.

Intracerebral (within the brain) attacks and aneurysms account equally for hemorrhages. Offering little or no warning, the intracerebral hemorrhage carries a high mortality rate.

More than half of the nation's 2.5 million stroke survivors require special care for varying disabilities. Fifteen percent of this group are institutionalized.

During a stroke, brain tissue dies rapidly. "We're working on a number of promising drug treatments which might protect the brain for a time," said Dr. Crowell, an Instructor in Surgery at Harvard Medical School.

"If we could give the patient medication to tide him over, we would have time to do our angiography and learn where a blockage might be.

"We also need a reliable test to tell whether tissue is dead or alive. If brain tissue has already been damaged, treatment aimed at reversing a stroke would be of no direct value.

"If, however, the tissue is just paralyzed because of lack of blood, we could operate to get that blood flow going again. We have several leads on developing a tissue test."

Even if the drug treatment and tissue test prove successful, Dr. Crowell cautioned it would still be a long time before they could be applied to patient care.

In addition to these projects, undertaken by the microneurosurgery-cerebrovascular unit in the MGH Neurosurgical Service, work is going forward to improve techniques of revascularization (resuming blood flow in vessels). Microsurgery has given researchers a long stride in this direction.

Collaborating in the research with Dr. Crowell, the unit director, are Dr. Robert G. Ojemann, a neurosurgeon; Dr. Richard B. Morawetz, Microneurosurgical Fellow; and Frank W. Marcoux, Research Technician.

Dr. Robert H. Ackerman, MGH neurologist and neuroradiologist, coordinates the cerebral blood-flow programs for the Stroke Center, one of 15 nationally which operate under grants from the National Institutes of Health. He also directs the Center's Carotid Evaluation Laboratory.

Of great importance in the effort to gain an upper hand on strokes is a computer-based registry maintained by the Stroke Service.

Established by the MGH in 1972 in conjunction with Beth Israel Hospital in Boston, the registry has catalogued and recorded information on more than 800 stroke patients.

Through the registry, the Service hopes to answer such questions as, How frequent are certain types of strokes? How might one stroke differ from another? How do the patients behave? What effects do certain treatments have?

"In other words, we're trying to learn more about the brain and how it works," said Dr. Mohr, the Stroke Service coordinator.

"As part of this, we're also doing special studies in different fields of higher cerebral function such as aphasia [loss or impairment of speech]. And in collaboration with the Arteriosclerosis Center at M.I.T., we're looking into various modes of treatment for arteriosclerosis."

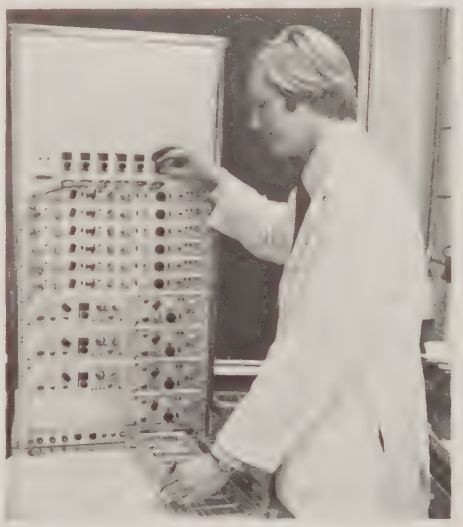
Dr. Robert S. Lees, an MGH physician, directs the M.I.T. center. He also is in charge of the MGH Noninvasive Diagnostic Laboratory.

The Stroke Service advises stroke patients on such matters as tests to be performed, treatment to be given, or surgery. Of some 600 stroke sufferers examined at the MGH during the past year, about half were seen by members of the Service.

For more than 20 years after its inception, the Service was led by Dr. C. Miller Fisher, an MGH neurologist and neuropathologist. In addition to many personal contributions to increase knowledge about strokes, Dr. Fisher is generally credited as the guiding hand in fostering interest in stroke research at the MGH.

Besides Dr. Mohr, neurologists associated with the Service include Drs. J. Philip Kistler, Michael S. Pessin, and David N. Levine.

Peering through an operating microscope, Dr. Richard B. Morawetz, Microneurosurgical Fellow, studies blood-vessel patterns in a laboratory specimen to improve understanding of strokes.



Frank W. Marcoux, Research Technician, uses polygraph to monitor cerebral blood flow in an experiment designed to develop new treatments for strokes.

Model of MASSACHUSETTS GENERAL HOSPITAL (Circa 1835)

Gazing across the Charles in 1835, you might have spotted a patient being carried by stretcher from an "ambulance boat" at the pier near the historic Bulfinch Building, the original MGH.

Nowadays the river flows farther from the building, and taller structures hide it from view. The original scene, however, is captured in a realistic 4-foot by 6-foot scale model in the Warren Lobby. A wheelwright shop, tavern, and market are among the many sights which catch the eye of the viewer.

The model is one of three elements of a free Bicentennial program at the hospital. Near the model are a series of wall exhibits graphically capturing some of the MGH highlights. Contrasted in one series are scenes showing early radiology with one depicting the use of a revolutionary brain scanner.

Held in the famed Ether Dome are regularly scheduled three-screen slide shows which depict the MGH as it was and as it is. Viewers are transported to October 16, 1846 when at the Ether Dome the use of anesthesia was first demonstrated to the world. They also watch as a patient in the early 1900s sits with both hands and one foot in buckets of salt water which formed a part of the late Dr. Paul Dudley White's electrocardiograph machine.

Through the show, visitors to Boston are gaining an insight into what makes a teaching hospital work. All exhibits were produced by hospital employees, and the funds were donated by benefactors expressly for the Bicentennial.

Appendicitis in a Child: Often Hard to Detect

(Concluded from Page 8)

Every hospital has the responsibility of avoiding unnecessary surgery, but if the presumption of appendicitis is strong enough, today the general rule is to take the appendix out.

While the operation itself is safe, delaying surgery until the diagnosis becomes certain is not. In addition, the appendix serves no real purpose.

"If 90 percent of the appendices removed at a hospital turn out to be inflamed, the surgical record is considered to be good," Dr. Welch remarked. "If all the appendices are inflamed, the surgeons are endangering some patients by not operating early enough.

"On the other hand, if the inflammation rate is 50 percent or under, then it's clear surgeons in that hospital are operating too often.

"In children, however, a 75 percent rate of inflamed appendices is acceptable because it is more difficult to diagnose the disease in a youngster. Taking chances with a child's appendix is just too dangerous."

During a visit to mainland China a couple of years ago, Dr. Welch discovered that appendicitis patients in that country could choose between an early operation or conservative treatment consisting of herb medicines (probably laxatives), acupuncture, and bed rest.

In a report published in the *New England Journal of Medicine,* Dr. Welch wrote that figures were submitted to him indicating that of 995 patients treated conservatively in China, only 6.2 percent failed to improve and required surgery. And only two deaths occurred.

The conservative regimen there purportedly was successful in 92 percent of patients with simple acute appendicitis, in 76 percent with suppurative (pus-producing) appendicitis, and in 50 percent with local peritonitis.

Although favorably impressed with many aspects of Chinese medicine seen during his three-week tour, Dr. Welch could not become enthusiastic over the Chinese methods of treating appendicitis. The figures supplied to him by the Chinese, he said, were difficult to reconcile with experience in the United States.

Even after nonoperative treatment, the chance of appendicitis recurring is quite high. "It's so high," Dr. Welch pointed out, "that we figure it is advisable for a patient who has recovered from an attack to have his appendix removed in another couple of months."

An appendectomy takes about 40 minutes, requires about four days of hospitalization (barring complications), and then is followed by several weeks of convalescence at home with gradual return to normal activity.

The regimen is flexible. A number of years ago, a patient came to Dr. Welch with acute appendicitis. A month after the operation, the patient reported for the customary checkup, and the doctor told him, "Okay, you can start doing things again."

"It turned out," Dr. Welch declared, "that a week before his checkup, or just three weeks after the operation, the patient confessed he had placed third in the U.S. Olympic trials for hammer-throwing."

Dr. Welch thinks the rules should not be that flexible.

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Appendicitis: Still a Treacherous Disease

To the uninformed, a patient with appendicitis is at no greater risk than someone advised to have his tonsils out.

In the view of an eminent surgeon, people who look nonchalantly upon the abdominal ailment exclaiming, "Oh well, it's only appendicitis," are living in a fool's paradise.

Even in this day of highly sophisticated medicine, warned Dr. Claude E. Welch, appendicitis can easily go unrecognized until the patient becomes extremely ill.

"The appendix is a very treacherous organ," said the MGH surgeon who served as president of the American College of Surgeons in 1973-74, and now is president of the American Surgical Association.

"Patients, particularly children, still come in with perforations. Their disease either went undetected or was treated in an inappropriate manner."

The appendix is a narrow tube attached to the cecum, the first part of the large intestine. Situated in the lower right side of the abdomen, the appendix can become inflamed by a bacterial infection, then rupture, spreading the disease to surrounding body organs.

Generally, a rupture will lead to peritonitis, an inflammation of the peritoneum, the membrane lining the abdominal cavity.

A century ago, the incidence of peritonitis was very high. Doctors knew little about the appendix and, in fact, the abdomen was regarded as out of bounds to the surgeon's scalpel. If infection had not already set in, the reasoning went, the surgeon might inadvertently put it in.

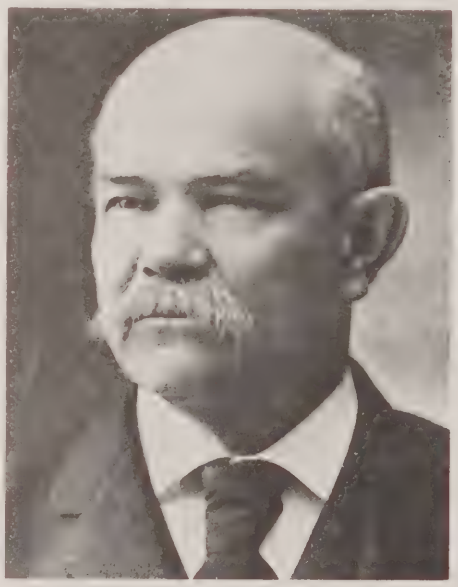
Even when Sir Joseph Lister, the English surgeon, introduced the concept of antiseptic operating rooms around 1870, a decade passed before antisepsis gained real recognition throughout the world.

Following the conquest of operative infection, surgery's next greatest challenge came in 1886 when Dr. Reginald H. Fitz, an MGH pathologist, recognized the true nature of the appendix.

He pointed out to his medical brethren that removal of an inflamed appendix would prevent extension of the inflammation to the cecum and the peritoneum. *The pathologist's convincing arguments opened not only the life-saving procedure for appendicitis but also the entire field of abdominal surgery.* But the gates swung slowly. A full year went by before the first appendectomy was performed.

Dr. Fitz originated the word "appendicitis." "The word was coined by me purely for practical purposes," he was quoted as saying. "I wished to call attention to inflammation of the vermiform [worm-shaped] appendix as the primary lesion, and that to which treatment was directly to be applied . . .

"I much prefer appendicitis to Fitz's disease."



Dr. Reginald H. Fitz

The MGH pathologist who recognized the true nature of the appendix. His work was instrumental in opening the field of abdominal surgery.

When Dr. Welch, a Clinical Professor of Surgery, Emeritus, at Harvard Medical School, trained at the MGH 35 years ago, he studied the hospital's appendicitis records.

"One out of every 25 people who entered the hospital with appendicitis at that time died from it," he stated. *"The mortality rate then was higher than the present death rate for removal of the colon due to cancer.*

"Nowadays, death following an appendectomy is very unusual. The rate is less than one percent. If the appendices were taken out at the earliest stage of inflammation, the rate would be only a couple of tenths of one percent."

The number of appendectomies performed at the MGH has declined sharply over the years with hospitals in outlying communities taking over much of that work.

"An appendectomy today is a relatively safe operation," Dr. Welch commented. But he added with emphasis, "The disease cannot be regarded with complete equanimity."

Symptoms of appendicitis often can be misjudged as evidence of other problems such as gastroenteritis, gallstones, a perforated ulcer, inflamed lymph glands, or diverticulitis.

Also, if the condition appears mild, the tendency might be to treat it conservatively rather than resort to an operation. The difficulty here is that although some patients may improve without removal of the appendix, others may suffer a rupture. Without surgery the course of the disease at an early stage often defies prediction.

Some years ago, a surgeon developed appendicitis that seemed so mild he was told he could "ride it out" if he had something else to do. The surgeon nevertheless elected to get the operation over with. On removal, the appendix clearly was ready to burst. "My God," the patient cried, "you don't mean we could have sat on that!"

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MGH News

Vol. 35 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September, 1976

Windpipe Obstructions Yield to Innovative Surgery

Patients Receive Fast Action on Complaints

When a patient enters a hospital, many things often seem strange, bewildering, perhaps even frightening. He is plunged into a totally different environment that includes new faces, new rules, and even a new vocabulary.

A patient may have to take tests, the purpose of which he does not understand. A nurse comes in and sticks him with a needle. A strange-looking machine is trundled to his bedside and connected to him. While he stares at the ceiling, his stretcher is wheeled through long corridors.

Are the results of the tests favorable or unfavorable? The patient may be afraid to ask because everyone is so busy. Sometimes a patient will admit, "I didn't want the doctor to think I'm stupid."

To aid in the personalization of the increasingly complex hospital surroundings and to respond to the problems, requests, complaints, and unmet needs of patients, the MGH maintains an Office of Patient Care Representatives. It serves as a liaison between the patient and the hospital.

Organized by Dr. Charles A. Sanders, MGH General Director, the office is empowered to deal with all referrals, regardless of origin or nature.

"No matter how good the hospital," Dr. Sanders said, "there are bound to be problems in patient care. Having patient-care representatives available to hear the complaints and take action when necessary provides a backup to protect the sick.

"In addition, the presence of a central office allows us to pinpoint whether problems are beginning to cluster in a specific area of care. If such areas are uncovered, measures can be taken to correct any difficulties before they become serious. In effect, what we have is an early warning system."

To carry out the role of the office requires special qualities.

"The key to the office's effectiveness is the manner in which it receives complaints and requests, gathers the relevant facts, investigates, and finally takes or recommends appropriate action," said Miss Isabella Tighe, director of

(Continued on Page 4)

Mrs. Chrisoula Pardalidou
Doing well at her home in Athens, Greece, after undergoing extensive tracheal surgery at the MGH

When 27-year-old Chrisoula Pardalidou flew to Boston from Athens, Greece, a few months ago, she was desperate. For almost two years she had labored to breathe. Every moment she feared that a tube placed in her windpipe (trachea) to carry life-giving air might shift, endangering the supply to her lungs.

Mrs. Pardalidou came to the MGH and, willing to endure anything, pleaded for help. She could not bear the thought of returning home, 4,700 miles away, without finding some relief from her ailment.

Dr. Hermes C. Grillo, MGH Chief of General Thoracic Surgery, had received and studied Mrs. Pardalidou's X rays before she made the Boston trip. An internationally recognized expert on tracheal problems, he felt her condition could be corrected, but he cautioned that a personal examination had to precede any surgical judgment.

Mrs. Pardalidou's condition was particularly complicated. Pneumonia had led to a severe breathing problem called respiratory failure. The insertion of a tube used for machine-induced breathing necessitated an incision in her trachea. After 45 days the respirator to which the tube was linked was withdrawn, but a narrowing (stenosis) developed low in her trachea near a juncture (carina) where the windpipe leads into the lung-connected bronchial tubes.

The young woman had been operated on in Athens, but the stricture recurred. In still another procedure, a long tube was extended from the tracheal opening down through the stricture.

(Continued on Page 2)

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EDITORIAL:

Choosing the Middle Ground

Hospital patient-care representative programs are beginning to grow in popularity around the nation. They complement nicely the consumer-advocacy movement which has swept the country. In the strange, bewildering world of hospitals, the need for some such program is obvious. The question, though, is what form should such an endeavor take?

This was the question faced by Dr. Charles A. Sanders when he became General Director four years ago and recognized the need for patient-care representatives. At the time only a very few hospitals had begun programs of this kind, and the results were not uniformly good. Should the MGH create an ombudsman who operates independently of the hospital? Would the choice of a hospital employee assigned to an existing department be the answer?

The ombudsman approach offered the advantage of someone who could act on the patient's behalf without thought of how the action would affect the hospital. On the other hand, an independent ombudsman stands an excellent chance of quickly alienating the physician, nurses, and administration if he ignores practicalities. Thus, a decision that might help one patient might deprive several other patients of the limited resources. And by blindly insisting on helping one patient at the expense of many, an ombudsman would lose the respect of the hospital and in the process lose his effectiveness in helping other patients.

The patient advocate assigned to an existing department represents the other extreme. He might wish to side with a patient in a given issue but must guard against automatically supporting the hospital's action.

For some institutions either of those two approaches might, under the appropriate circumstances, prove effective. Dr. Sanders, however, chose a middle ground which he hoped would ultimately produce the best results for the most patients. He elected to establish an office that reported directly to the General Director and provided that office with complete independence of any other department. The result has been gratifying. As a page 1 article indicates, the patient-care representatives have earned the respect of the patients without alienating the physicians and have, under Miss Isabella Tighe, become a model for other hospitals to emulate. The representatives have been able to consistently help patients with substantiated complaints. At the same time the office has been able to identify potential problem areas by interviewing patients who do not complain. In this way a patient who has a complaint knows he has someone he can count on to correct the problem. The patient whose complaint turned out to be unwarranted usually ends up understanding why. And a system has been established to ferret out potential problems and apply corrective measures to prevent them.

Surgeons Overcome Major Complications In Tracheal Repair

(Continued from Page 1)

In addition to a very perilous situation, Mrs. Pardalidou's difficulties were compounded by chronic lung disease and a blood deficiency that lowered her resistance to infection.

Fully aware of the complexities, including the enormous amount of scarring that he would encounter from the earlier surgery, Dr. Grillo elected to operate.

The MGH surgery required nine and a half hours. As expected, the surgeons fought scar tissue every millimeter of the way. They removed three centimeters (about 1¼ inches) of Mrs. Pardalidou's windpipe.

To join the healthy upper and lower segments, they performed a laryngeal-release operation designed to lower the patient's larynx, or voice box, without disturbing critical structures such as nerves. Then, after finding they were still unable to join the tracheal ends, they decided to open her chest and raise both her right lung and the entire carina area. Through these manipulations, they managed to rejoin the trachea.

Assisting in the challenging, longer-than-expected operation were Drs. Alan D. Hilgenberg, Chief Resident in Thoracic Surgery; David J. Cullen, who directed administration of the anesthesia; and Costas Sbokos, an MGH Fellow from Greece.

Despite the difficulties, the surgery went well. For the next four or five days, Mrs. Pardalidou was closely observed in the Respiratory Intensive and Acute Care Unit by its codirectors, Drs. Henning Pontoppidan and Roger S. Wilson.

After returning to her regular hospital room in the Baker Building, Mrs. Pardalidou had a rapid but not easy recovery. Due to the laryngeal-release operation, she at first had trouble swallowing. By the time she returned home to Greece, however, she could

Photographs: Page 1, courtesy of Dr. Costas Sbokos; p. 3, courtesy of Dr. Hermes C. Grillo; pp. 4, 5, Joel Salhanick; p. 6, courtesy of Dr. Arthur M. Kleinman; p. 7, courtesy of Dr. Edwin H. Cassem; p. 8, courtesy of Dr. Thomas P. Hackett.

swallow without difficulty, and she was breathing normally.

Dr. Grillo emphasized that the surgeons represented only one critical component of Mrs. Pardalidou's care.

"The thoracic anesthetists did a marvelous job," he declared, "and without the Respiratory Unit, patients like Mrs. Pardalidou couldn't possibly survive postoperatively. The nurses on Baker 10 are very familiar with the special-care needs and handle them well."

Dr. Newton E. Hyslop, Jr., an MGH immunologist, kept the patient's blood problem, a gamma-globulin deficiency, under control.

Dr. Grillo's interest in tracheal reconstruction began some 15 years ago when little research on the subject was taking place.

The standard surgical dogma at the time was that you could not remove more than two centimeters (about ¾ inch) of a trachea and still bring the ends together dependably. Dr. Grillo developed techniques making it possible to remove safely up to half the trachea, or about 5½ centimeters (about 2¼ inches).

Tracheal damage can result from tumors, certain inflammatory diseases, or physical injury, such as from an automobile accident. But in the majority of instances, the impairment stems from use of a respirator.

When a tube connected to a respirator is inserted into a trachea, a cuff around the tube must be inflated to seal the rest of the airway. In earlier model cuffs a proper seal required high pressure. This had led to rings of dead tissue in 10 to 15 percent of surviving respiratory patients.

Use of an MGH-designed, low-pressure respirator cuff (left), to replace a high-pressure cuff (right), has virtually eliminated a major cause of windpipe strictures. When a respirator tube is inserted into a trachea, the new cuff gently seals the rest of the airway.

Six years ago while working under grants from the U.S. Public Health Service and the John A. Hartford Foundation, an MGH team comprised of Drs. Grillo, Pontoppidan, Joel Cooper (now at Toronto General Hospital), and Bennie Geffin (now at the J. B. Thomas Hospital in Peabody, Mass.) designed a new high-volume, low-pressure cuff.

"Since we started using the low-pressure cuff at the MGH, the number of cuff-related strictures here has fallen to zero," Dr. Grillo remarked.

"We continue to repair a fair number of these obstructions, but the patients are referred from other institutions which employ high-pressure cuffs."

Patients have traveled to the MGH from Europe, South Africa, Australia, South America, Mexico, Canada, and many parts of our own country to take advantage of Dr. Grillo's expertise.

He has carried out some 200 tracheal reconstructions, authored 46 papers on his specialty for scientific journals, and lectured worldwide.

Few surgeons handle tracheal problems because they are rare. While many doctors do keep abreast of the latest techniques by reading medical literature, they have little opportunity to gain firsthand knowledge.

"You can't just read about it and decide to do it," Dr. Grillo cautioned. "There are always wrinkles so that, in the initial phases at least, the results may not be very good. We do encourage doctors to watch us."

He estimated that more than 90 percent of the operations he has performed for benign defects such as strictures have been successful.

Evaluating the results of surgery for malignant tumors is more complicated, he pointed out. But he said records today show long-term survivors and apparent cures in primary cancers of the trachea where formerly there were no such successes.

A Professor of Surgery at Harvard Medical School, Dr. Grillo spoke highly of a surgeon in Moscow who began tracheal research independently years ago and devised his own surgical procedures. "He does beautiful work," Dr. Grillo said, "and has had vast

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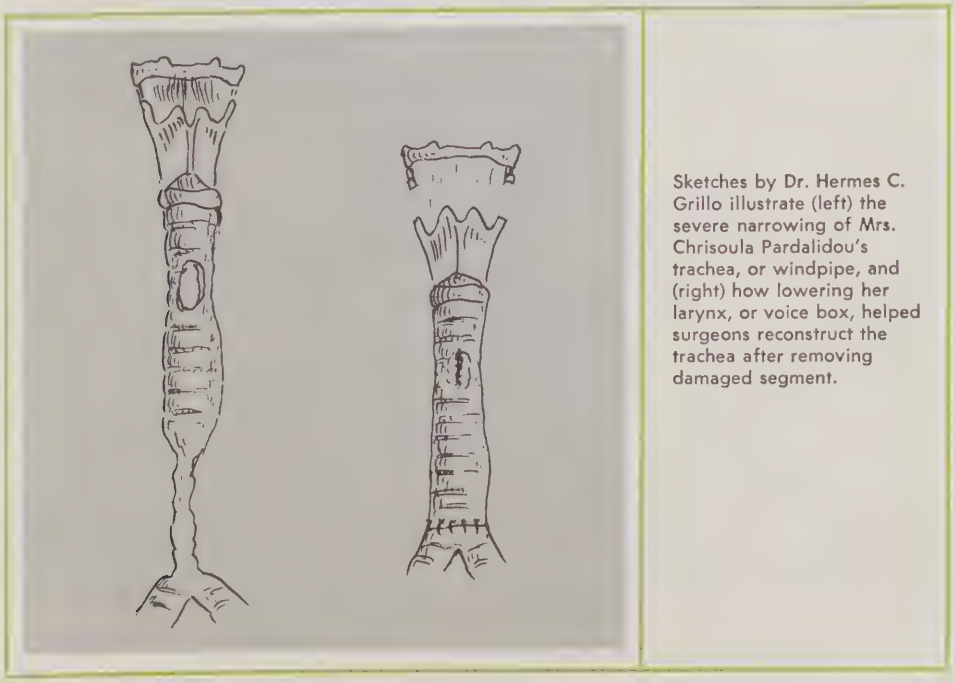

Sketches by Dr. Hermes C. Grillo illustrate (left) the severe narrowing of Mrs. Chrisoula Pardalidou's trachea, or windpipe, and (right) how lowering her larynx, or voice box, helped surgeons reconstruct the trachea after removing damaged segment.

Woman Waits Decade For Tracheal Help

(Concluded from Page 3)

experience because in Russia most patients with tracheal difficulties are sent to him."

Although the trachea holds his special interest, repair of this air channel represents only a small phase of Dr. Grillo's surgical practice at the MGH. He focuses most of his attention on diseases of the lungs and esophagus (food passage).

Difficulty in diagnosis may account in large measure for the relatively few reported instances of tracheal injury.

"We've discovered that a large number of patients sent to the MGH had been treated earlier for asthma because they had developed a wheeze or shortness of breath," Dr. Grillo explained.

"Since the condition is so rare, physicians based outside of a hospital were unlikely to think of postintubation stricture."

Dr. Grillo shuns prosthetics in tracheal surgery. "Foreign materials work where they can remain sterile," he said. "When it comes to the trachea, you would have a chronic inflammatory process. A prosthesis might work occasionally, but we need something much more dependable."

Can a patient's own tissue, such as a section of colon, substitute for that part of the windpipe which has been removed?

"It's been tried but hasn't worked well," Dr. Grillo commented. "What you need is a piece of tubular material with an epithelial [strong membranous] lining so that it won't stricture when you breathe, and with a good blood supply. There aren't many things like that."

Recuperating after tracheal surgery performed by Dr. Hermes C. Grillo, Miss Maureen Lipton of Margate, N.J., has blood pressure taken by Miss Paula Galada, RN.

Several months ago Dr. Grillo operated on a 32-year-old Italian woman who had endured an injured trachea for 10 years.

Life was a constant struggle for Elia Marra after the damage was incurred during respiratory treatment in Rome. She was unable to muster enough breath to blow out a match. Often to gather enough air to utter words, she had to press a finger against the opening in her windpipe. She was unable to engage in any strenuous work. On contracting a cold she had to be placed in an oxygen tent and treated with antibiotics.

Miss Marra's plight was brought to Dr. Grillo's attention while he was in the Italian capital to deliver lectures. The surgery at the MGH was arranged three months later and went well.

Dr. Mario Riccardi, a child psychologist and Miss Marra's employer at a children's center 75 miles from Rome, accompanied her to Boston. He told of a vow she made after the surgery restored her breathing to normal:

"Our center is near the mountains, and there are crickets around. Elia killed them when they got into the house. But now she's promised, 'I will never kill a cricket again.' " 'Cricket' in Italian is 'Grillo.'

General Director Gets Patient-Care Reports

(Continued from Page 1)

the program since it began three years ago.

"What we do initially is relay the perceptions of the patient to the physician, the nurse, or whatever staff member may be involved. The patient may feel that his doctor is not visiting frequently enough, or that the nurse should answer the light more quickly.

"Often the difficulty is the result of a misunderstanding and is easily cleared up by the simple act of communicating. The alternative could be increased friction which could even lead to the threat of a senseless legal suit."

A graduate of Glasgow University and the London School of Economics, Miss Tighe came to the MGH in 1973 from Blue Cross-Blue Shield where she was Director of Medicare for Massachusetts. Her staff at the hospital includes Mrs. Ann Marshall and Miss Barbara Eddy, a secretary. Assisting is a Patient Care Committee, a volunteer group headed by Mrs. Eleanor Hackett.

Each month, Miss Tighe files with Dr. Sanders a comprehensive report listing the patient matters her office has handled (usually about 200) and pertinent details, such as the frequency of any particular complaint or request.

"One of the things we don't want to do," she said, "is handle the same problem day after day and month after month. If at some point we can document that there is something wrong with a system, we can work to get it changed."

Complaints do not come from any particular type of patient or area of the MGH. "Hospitalization is the great equalizer," said Miss Tighe. "Everybody feels pretty dependent on everybody else. No one group of patients is more likely than any other to have or express anxieties."

Originally, there was consideration to calling the patient-care representative a "patient's advocate." But that idea quickly faded. " 'Advocate' implies an adversary situation," Miss Tighe explained, "and the last thing a patient wants is someone representing him in a fight of some kind."

Since the patient-care representative

Many Chinese Retain Old Medical Customs

A 33-year-old Chinese man trudged into the MGH Medical Clinic complaining of dizziness, fatigue, pains in the upper back, a sensation of heaviness in his feet, a 20-pound weight loss, and insomnia.

An examination revealed no obvious reason for any of the afflictions, but the man did seem very depressed. Questioning disclosed that he had lost most of his savings in stock-market investments and in a restaurant business that had failed.

Mr. W. admitted being anxious about his financial status but vehemently denied any emotional upset. He attributed his problems to "wind and cold" disorders and to "insufficient blood."

Initially, Mr. W. refused psychotherapy, contending that talking would not help. Finally he accepted psychiatric care provided that it would include some kind of medication.

Dr. Arthur M. Kleinman, a psychiatrist then at the MGH, prescribed antidepressants. Within three weeks all symptoms of physical and emotional illness vanished. Mr. W., however, continued to deny that he had had a mental problem. Talk therapy, he insisted, had been of no help. But he conceded that perhaps the antidepressants were effective against "wind and cold" disorders.

"Mental illness is strongly stigmatized in Chinese culture," said Dr. Kleinman, who in July joined the University of Washington Medical School as an Associate Professor of Psychiatry. He also directs a Division of Social and Cross-cultural Psychiatry.

(Continued on Page 6)

enjoys complete independence and acts strictly in accordance with the merits of each situation, the hospital staff encourages the program. In fact, more than half of the referrals received by Miss Tighe's office arise from the staff itself.

"Word might come that a particular patient has a problem but is reluctant to discuss it," she said, "so we'll try to get at the root of the matter.

"Our Patient Care Committee also is in a position to smoke out any problems. We have ten handpicked volunteers who interview noncomplaining patients on a random basis.

"These interviews allow us to identify areas receiving consistent praise, and we see to it that such praise is passed on. We don't want the staff to feel that when they see us coming there's necessarily a problem on the way."

Since the inception of the Patient Care Representatives office, there has never been an instance in which both sides stood rock firm on an issue.

An informational booklet describing how the MGH functions is issued to all patients being admitted and alerts them to the service offered by the patient-care representative.

In addition, the booklet includes the hospital's statement on the rights of the patient. The statement, while incorporating many points contained in the "Patient's Bill of Rights" promulgated by the American Hospital Association, is phrased in a manner which the MGH feels is more positive and less rigid.

Of 7,000 hospitals in the United States, about 500 have patient-care representatives, but their nature varies greatly. The direct relationship to the hospital's chief executive officer and the autonomy granted make the MGH representatives' office unusual.

By contrast, some hospitals include the office as part of their social service department, which is deeply involved with such important responsibilities as helping patients cope with social, environmental, and emotional problems associated with illness; assisting them in using prescribed medical care; and providing for postdischarge planning.

In other hospitals, patient-care representatives may work under the public relations director. Billing departments or unit coordinators in some institutions may have limited authority to resolve patient problems.

At the MGH, the patient-care representative is regarded as an indispensable ombudsman. By obtaining prompt corrective action on substantiated grievances and by documenting lack of merit in other complaints, the representative is effective and fair.

The importance accorded the patient-care representative at the MGH is underscored by membership on some of the hospital's most prominent committees – among them, Operations, Human Studies, Resource Allocations Board, Utilization Review, and Critical Care.

From time to time, the hospital hosts visitors interested in learning the methods used by the patient-care representatives. On an average of once a month Miss Tighe fulfills speaking engagements in various parts of the country.

The Colorado legislature has enacted a bill mandating patient-grievance procedures in all hospitals in that state. Officials at the state Capitol in Denver have written to the MGH requesting guidelines to help them set up the program.

In explaining the success of her office, Miss Tighe borrowed a line from the late Dr. Francis Weld Peabody, who was a Professor at Harvard Medical School:

"The secret of the care of the patient is in caring for the patient."

Mrs. Eleanor Hackett, chairman of volunteer Patient Care Committee, visits Mrs. Margaret Grinold to find out how the orthopedic patient from Wallingford, Conn., feels about her care.

Chinese Population Growth Leads to Study

(Continued from Page 5)

Addressing an MGH medical meeting (Psychiatric Grand Rounds), he mentioned a study in which he participated three years ago in Boston's Chinatown.

"We found," he said, "that marriage brokers, before they would arrange a match, were still inquiring whether mental illness existed in a family. Mental illness was considered cause to remove a family from the marital pool for three generations."

Trained both in anthropology and psychiatry, Dr. Kleinman has conducted extensive research on psychiatric services in Chinese society. During 1969 and 1970, he worked and studied in Taiwan for 15 months as a Fellow of the National Institutes of Health. He returned to Taipei for nine months last year as a Visiting Lecturer at the National Taiwan University.

Why should a psychiatrist spend his time studying psychiatry in another culture? Dr. Kleinman explained that by 1980 more than three-quarters of the world's population will be non-Western. One-quarter of the population will be Chinese. Another one-seventh will be Indian.

"The psychological theories we use and the methods and concerns we apply to illness have come primarily, if not entirely, from Anglo-American and European traditions," he remarked. "This clearly is a problem. Illness must be looked at in terms of people everywhere."

With 16 million people, Taiwan, 80 miles off the coast of mainland China, ranks as one of the most densely populated nations on earth. The island extends 249 miles long and 93 miles wide. The Taiwanese observe the traditional religion of the Chinese, a mixture of Taoism and Buddhism.

Two professional medical systems operate on Taiwan. *Hsi-i* (Shee-ee), or Western-style medicine, offers complete health care, both public and private. *Chung-i* (Choong-ee), or Chinese-style medicine, is practiced in the classic manner by highly trained physicians who staff their own clinics and pharmacies.

Side by side with these systems exist other types of care, such as sacred folk healing.

"Medical practice is usually handed down through generations of families in China," Dr. Kleinman remarked. "Often, Chinese practitioners will claim that an ancestor gave them secret remedies or passed down some sort of knowledge or power. Most of the time this assertion is not true but still patients will look for this sort of thing in their treatment."

The folk healer, called a shaman, may display his powers at festivals, perhaps standing atop a fire or walking on nails. Dr. Kleinman found in his studies that shamans devoted three-quarters of their time to treating illness. Supporters of shamanism believe that the healers are possessed by a god who speaks through them.

Almost all minor psychiatric problems in Taiwan are treated outside the professional systems of medicine. Ninety percent of all health care remains within the context of the family.

Elderly woman visits shaman in Taipei for medical consultation.

When a person exhibits severe depression, relatives respond quickly. But rather than consider the possibility of a psychiatric disorder, they will tend to his physical symptoms and describe the ailment as a "neurological weakness."

The National Taiwan University Psychiatric Hospital offers treatment on a par with the average psychiatric hospital in the United States but is the only such university-affiliated institution on the island and can admit fewer than 50 patients.

The government of Taiwan operates a number of large psychiatric hospitals. However, they are filled with chronic patients who are almost totally asocial.

In all of Taiwan there is only one full-time psychotherapist, and she treats the elite class and foreign visitors. Like Mr. W., the MGH clinic patient, the Chinese belittle verbal therapy.

"They will only pay for visible treatment," Dr. Kleinman said, "even if you do a lengthy workup evaluating the patient.

"I know of a very successful private practitioner in Taipei who kept three large vials of colored fluids, one red, one blue, and one green. Before the government stopped him, he used to give his patients four shots of each fluid which essentially contained inert substances. He was playing to the crowds in terms of charging."

Most Chinese medicines in Taiwan come from Szechuan province on the mainland. The Taiwan government allows only medicine to be imported from the People's Republic.

Herbs constitute the bulk of the

Shaman performs healing ritual for woman suffering from chronic arthritis.

High School Freshman Called on to Serve as University Instructor

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Hackett's life that he was cut out for a medical career. Born 47 years ago in Cincinnati, *he joined the faculty of the University of Cincinnati Medical School at the age of 13 as an Instructor in Physiology.*

This early taste of academia developed from an unusual chain of events. A hobby of snake collecting led to a deep interest in biology; a friendship with the University of Cincinnati's Professor of Physiology, Gustav Eckstein; a study of physiology textbooks; and a job as a helper in the professor's laboratory.

In the course of a recent lecture to doctors and medical students in the MGH's historic Ether Dome, Dr. Eckstein, now 86, recounted his initial meeting with Dr. Hackett:

"Tom contacted me to say he had read a book I had written on Hideyo Noguchi, the famous bacteriologist. The boy wanted to know what the outlook was for a naturalist in the modern world.

"I told him to come and see me, and then I tried to switch his interest to physiology. I gave him six books and told him to come back in six weeks. When he returned, having read the books, I hired him to work in the lab. I wasn't taking any chances. I knew he could handle the work."

When World War II created a shortage of instructors at the university, the teenager's proficiency in physiology had already become well-known. Despite his youth (he was still a freshman in high school), he was asked to teach a laboratory course.

Dr. Oliver Cope, Senior MGH Consultant in Surgery, addressing seminar on death and grief, one of a series of postgraduate courses organized by the MGH Psychiatric Service.

To no one's surprise, Dr. Hackett packed four years of high school into three. Then, it was on to the University of Cincinnati for a Bachelor of Science degree, also obtained in three years.

Four years later, he took his medical degree from the same university and had chosen surgery as his field. The young doctor interned at a U.S. Public Health Service hospital in San Francisco. Following internship, to meet government service obligations, Dr. Hackett volunteered to serve with the USPHS in Korea or at a remote Indian reservation in the United States.

"I was looking for adventure, but they figured something must be wrong with me to request these duty posts," he said, "because I soon found myself working in the federal prison on Alcatraz. Afterward I served as Chief Medical Officer at a federal lockup in Chillicothe, Ohio."

During his prison work Dr. Hackett learned that surgery was not his cup of tea. "To be a good surgeon you have to love working with your hands the way a sculptor does. It took a long time for me to admit to myself that I was no sculptor. When I left surgery I knew I was doing the right thing, but I still miss it."

The specialty to follow narrowed to a choice between psychiatry and neurology. At the urging of his mentor, Dr. Eckstein, and Ohio colleagues who had worked at the Massachusetts General, Dr. Hackett chose to come to the MGH to make up his mind.

A six-month stint in neurology turned out to be enjoyable. But he was lured into psychiatry in part by the prospect of becoming Dr. Weisman's resident and working with him in the Psychiatric Consultation Service.

"It was an ideal situation," he said, "because it not only put me in psychiatry but also kept me in medicine, seeing medical and surgical patients.

"I consider myself first a physician, then a psychiatrist. I believe that psychiatry is a medical specialty."

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traditional Chinese medicines. As long as 2,000 years ago, the Chinese pharmacopoeia contained over 2,000 prescriptions. At least 500 involved active and potentially effective substances.

Stores selling Chinese drugs in the traditional manner as bundles of chopped-up herbs, and more recently in liquid, tablet, and powder form, abound in Taiwan. "Here lies a great danger," Dr. Kleinman warned his colleagues assembled at the Lindemann Mental Health Center. "Some Chinese pharmaceutical companies have been known to mix Western drugs such as antibiotics or steroids into their preparations. Unless you find out just what you're getting, you can be in trouble. Some mixtures contain so many active substances that it's impossible to sort them out."

Dr. Kleinman's experiences and research results are described in a book entitled *Medicine in Chinese Cultures: Comparative Studies of Health Care in Chinese and Other Societies,* just published by the National Institutes of Health.

Recently, he also became editor of a journal called *Culture, Medicine, and Psychiatry.* The publication considers both psychiatric and medical illnesses in different cultures from the perspective of how cultural factors influence these maladies and their treatment.

At the University of Washington Medical School, Dr. Kleinman hopes to demonstrate how anthropological and cross-cultural studies, such as those carried out in Taiwan, can help improve the skills of doctors in communicating with their patients and in treating the personal and social problems that disease gives rise to.

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Psychiatry Plays Growing Role in Medicine

The psychiatrist who diagnoses and treats mental disorders is finding his participation in medicine ever expanding.

Increasingly, medical and surgical practitioners are calling upon the skills of psychiatry to assist in the care of the physically ill.

"Psychiatry is much more a part of medicine than it used to be," said Dr. Thomas P. Hackett, newly named Chief of the MGH Psychiatric Service. "Much of the expertise accumulated by psychiatrists can be applied directly to medical patients.

"For example, we are now called upon to help in the management of patients who won't or can't comply with a treatment regimen, such as a diabetic who forgets to take his insulin or who cannot follow a diet.

"Many individuals with conditions characterized by chronic pain are called to our attention in an effort to determine the importance of psychological factors in the persistence of their suffering.

"A host of recent investigations has pointed to the relationship between serious life changes such as marriage, loss of a job or of a spouse, and the onset of a medical illness in susceptible people. Our services are often sought in an attempt to reduce this likelihood through psychiatric therapy.

"These are just a few examples of how psychiatry has been utilized in the modern management of medical patients."

Expanding the applications of psychiatric knowledge in patient care and pressing forward with vigorous research into the perplexities of the mind are priorities set by Dr. Hackett for his department. Many future studies by the Psychiatric Service will be geared toward finding ways to improve the treatment of general hospital patients.

"Work on psychiatric disorders–both in the outpatient and inpatient settings–will continue," said Dr. Hackett, Professor of Psychiatry at Harvard Medical School.

"Added to this will be a good deal of research on depression and on the neuroendocrine basis of mental states [interrelationships between glands and the nervous system], and we'll continue researching the psychiatrist's role with heart and cancer patients, and patients with chronic pain syndromes [groups of symptoms] as well as terminal illnesses."

A member of the Psychiatric Service since 1955, Dr. Hackett served as its Acting Chief for two years before being formally appointed to head the department, succeeding Dr. Leon Eisenberg.

With more than 170 full-time professionals, the Psychiatric Service ranks as one of the largest departments in the MGH. Psychiatry became a distinct service, separate from neurology, in the early 1930s. Its first chief was Dr. Stanley Cobb.

Dr. Thomas P. Hackett

"Under his direction," Dr. Hackett said, "growth and recognition occurred simultaneously to make the department of psychiatry one of the distinguished training facilities in the country.

"Many of the house officers who served under Dr. Cobb later became eminent figures in national and international psychiatry."

To maintain its "highly regarded residency-training program, excellent research arm, and variety of outpatient and inpatient services, the Psychiatric Service needs dependable sources of income," Dr. Hackett said. A concerted effort to make the department financially self-sustaining already has been launched.

Members of the service have organized a series of postgraduate seminars, presented under the auspices of the Harvard Medical School's Department of Continuing Education.

The most recent seminar, given at the end of July, was on Emergency Psychiatry and Crisis Intervention. Previously, a two-week postgraduate course in psychiatry was offered, and there have been seminars on death and grief. All of the programs have attracted nationwide interest. Preliminary plans call for about six seminars a year.

Dr. Hackett also hopes to arrange compensation from third-party payers, such as insurance companies, for use of the hospital's Psychiatric Consultation Service.

Established in 1956 by Dr. Avery D. Weisman, MGH psychiatrist, and Dr. Hackett, the Consultation Service with about 10 full-time staff members is regarded as one of the best units of its kind in the country.

"I would say that 20 years ago only about 30 percent of the nation's major teaching hospitals had psychiatric consultation services," Dr. Hackett remarked. "Currently, based on a poll we conducted, 95 percent of teaching hospitals maintain such a service."

It became apparent early in Dr.

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MGH News

Vol. 35 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1976

Specialists Tackle Rising Trend of Sports Injuries

Stepping Up the War on Cancer in Women

Cancer has frequently been termed the silent killer. An uncontrolled growth of cells within the body, the disease presents no symptoms in its early stages. A person may feel perfectly well until the malignancy affects a vital organ, obstructs a passage, or presses on a nerve. By then, all the skills of medicine may be needed to fight back effectively.

The earlier cancer is diagnosed, the better the prospect is of recovery.

Ten or 15 years ago cancer of the cervix (the mouth of the uterus or womb) was by far the most common type of malignancy found in women. At one time 4 out of every 1,000 women in America suffered from the frequently fatal affliction.

Because of a vaginal-smear technique called the "Pap" test, the mortality rate declined dramatically.

Named for its developer, Dr. George N. Papanicolaou of Cornell University and New York Hospital, the "Pap" test enables physicians to detect cervical cancer faster and more easily than through a tissue examination (biopsy). Some of the pioneer work on the "Pap" test was conducted at the MGH.

Today, if discovered during preinvasive or very early invasive stages, cervical cancer in almost all instances can be cured.

Tragically, the good fortune of early detection has not been extended to women with cancer of the ovaries. According to the American Cancer Society, ovarian cancer will be diagnosed in 17,000 more women in this country during 1976, and 10,800 patients will succumb from the disease, now labeled the most common cause of death from female pelvic malignancies.

Development of more effective diagnostic procedures and treatment for ovarian cancer is the research goal of a new MGH department head, a nationally recognized authority on gynecological tumors.

On July 1, Dr. James H. Nelson, Jr., Chairman of the Department of Obstetrics and Gynecology at the State University of New York's Downstate Medical Center, became Chief of Staff of Vincent Memorial Hospital, the MGH's gynecological service.

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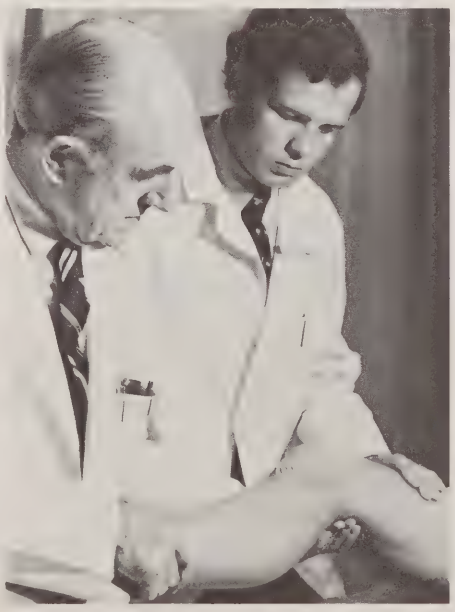

Knee repair is examined by Drs. Carter R. Rowe (left) and Bertram Zarins, MGH orthopedic surgeons. Joint injuries are a common sports problem.

Tearing down the sidelines bouncing off player after player, 17-year-old Tony D. seemed headed for a touchdown. But at the 10-yard line, a pair of brawny arms reached out, and Tony crumbled under the weight of a 220-pound tackle. For good measure, a second opponent pounced on the prostrate ball carrier.

When the pile untangled, Tony was writhing in pain. Rushed to a hospital, he was found to have torn the ligaments of his right knee. The injury was serious enough to sideline him for the rest of the season, and possibly for good.

What happened to this youngster cannot be termed an isolated accident. Although he appeared as healthy as anyone else on the team, he had already had two knee operations, a factor which can increase the risk of injury severalfold. Proper conditioning and bracing could have prevented, or at least minimized, his injury.

During preseason examinations, doctors customarily check the athlete's heart, lungs, and other organs. Experts are convinced that if an athlete's physical structure were also taken into consideration, the injury toll would nosedive.

There is evidence to show that a young man who is "loose jointed" might prove injury-prone in football, but he could, with a lot less physical risk, turn out to be a champion runner, tennis player, swimmer, or gymnast. His speed, agility, and endurance could outweigh his lack of power and strength.

Although professional and college

(Continued on Page 2)

MGH *News*

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EDITORIAL:

Healing the Injured Athlete

Americans have long been armchair athletes. Before television, the sports enthusiast got his exercise by walking from the parking lot to his seat in the athletic arena. The advent of television made spectator sports even more sedentary by restricting activity to the path between the refrigerator and the easy chair. To some degree, however, this lethargic pattern is changing. President and physician alike have preached the doctrine of physical fitness, and the results are manifest. One has only to stroll through most city parks to view a sporadic stream of joggers bouncing along. Tennis, with its demands on heart, lungs, and joints, has lured many from the more relaxed sport of golf. More than ever, people are lifting weights, becoming gymnasts, or choosing other activities which require doing rather than watching. And the trend begins in childhood with what some feel is the tyrannical invasion by organized leagues for the young athlete.

In general those activities are considered beneficial to the person who embarks on a sensibly planned program. How much benefit accrues, no one really knows. What is known and what is believed will form the basis for an article which will appear in a future issue of the *MGH News*. In the current issue, however, a page 1 story deals with another aspect of the sports-exercise boom: the injuries which befall people whether they get their thrills from skateboarding, playing professional football and hockey, or weekend tennis.

Each sport makes a different demand on the participant, and each tends to cause certain types of injuries. Healing the injured athlete takes a special kind of expertise. So does helping people to select the type of sport for which nature made them more proficient and less injury-prone. And so does prescribing exercises to reduce the hazard of injuries.

To begin gradually to achieve some of those goals, the MGH last month opened a sports clinic. The orthopedists who will direct the clinic, which is announced in this issue of the *News*, will work with a great variety of other specialists to provide the best sports care possible. They will also complement the efforts of trainers and coaches who can supplement the expertise of the physician. To develop further this burgeoning field, the MGH hopes to learn and to teach by cooperating with similar clinics elsewhere. For patients in a hospital which has already been selected to provide excellent care to some of America's best-known athletes, the result should be gratifying.

Sports Medicine Fills Void in Health Care

(Continued from Page 1)

athletes have access to expert medical care, many amateur athletes as well as physicians and trainers caring for teams lack a place to turn to for consultation on sports-related medical problems. *To help fill this medical void, the MGH Orthopaedic Service has established a Sports Medicine Clinic.*

"The number of Americans participating in athletics has risen astronomically," said Dr. Henry J. Mankin, Chief of Orthopaedic Surgery. "As a result, sports injuries have reached epidemic proportions. We have long felt a need to develop a means of coping with this problem."

The clinic is staffed by Drs. Dinesh Patel and Bertram Zarins, MGH orthopedic surgeons, who are also instructors in orthopedic surgery at Harvard Medical School.

Assisting them are Drs. Mankin and Carter R. Rowe, a Senior Consultant in Orthopaedics, as well as a battery of other MGH consultants representing virtually every other medical and surgical specialty in the hospital.

Since a vast number of sports injuries involve the musculoskeletal system, it was logical that specialists in bone and joint problems should launch the clinic. The goal of the field of sports medicine, however, is the overall care of the athlete.

The Sports Medicine Clinic meets once a week in the orthopedic outpatient department. The primary purpose of the clinic is to evaluate and treat athletes for medical problems relating to sports. Initially, the emphasis is being focused on musculoskeletal matters with athletic trainers and physical therapists rounding out the care given by orthopedists. With the aid of consultants from a variety of specialties, other medical problems unique to athletes are also cared for.

A major goal of the clinic is the education of medical and paramedical personnel so that they will be better equipped to deal with the athlete and his difficulties.

Photographs: Pages 1, 3 (lower), Robert Crivello; pp. 3 (upper), 8, Mary M. Hoffmann; pp. 4, 5, courtesy of Dr. James H. Nelson, Jr.; p. 6, courtesy of Dr. Anne P. Forbes; p. 7, MGH Archives.

Dr. Dinesh Patel, MGH orthopedic surgeon, performs arthroscopy to diagnose patient's knee injury. With the arthroscope, a surgeon can inspect the damage to a joint and plan repairs.

As the clinic grows, it will expand into research activities to look into causes of common injuries, ways to prevent them, and criteria to determine the suitability of candidates for certain sports or conditioning programs.

"We also plan to hold seminars at least once a month on sports medicine," said Dr. Patel. "Coaches and trainers will be invited as well as physicians, nurses, therapists, brace specialists, and others in the hospital who are interested in athletics.

"Coaches know more about their sports than do doctors, but doctors know more about injuries. The multidisciplined approach can provide many of the answers to questions on safety."

In Little League baseball, a number of young pitchers have ruined their elbows by throwing too hard at an early age. Medical studies have shown that the stress of repetitive pitching can cause the elbow on the throwing arm of a young hurler to develop abnormally. The bones and growth centers in children are simply too soft to withstand sustained forceful exertion.

These studies have resulted in recommendations which can prevent permanent injury to the elbow. Among them are eliminating the curve ball and limiting the number of innings per week that a youngster below a certain age can pitch.

In professional sports the need to evaluate musculoskeletal features was recognized long ago. An athlete with hypermobile joints (which bend too far backward and forward) may have to do certain exercises to strengthen the joints. On the other hand, a tight-jointed player may have to do stretching exercises to loosen his joints in order to make him perform better in a given sport.

To help organize the program for the MGH clinic, Dr. Zarins spent three months this spring in the United States and Canada visiting centers specializing in sports medicine.

The expenses were covered by a traveling fellowship endowed by Dr. Edwin F. Cave, a member of the hospital's Board of Consultation and for many years Chief of the MGH Fracture Clinic.

The Cave Traveling Fellowship was established in 1972 to accomplish two goals: to further the education of the recipient and to widen the horizons of the orthopedic staff through knowledge brought back by the recipient.

Dr. Zarins went to Oregon, California, Oklahoma, New York, Georgia, and Canada, spending about two weeks at each location. Since the knee is the joint most commonly involved in a disabling sports injury, Dr. Zarins spent most of his time studying the treatment of athletic injuries to the knee.

Dr. Patel did much of the preparatory work for the Sports Medicine Clinic. He is an affiliate member of the American Orthopaedic Society for Sports Medicine and is also a member of the Sports section of the Massachusetts Medical Society.

He has done extensive work at the MGH in arthroscopy. Arthroscopy is a surgical procedure involving a special instrument called an arthroscope which allows the physician to see and study the interior of a damaged joint (usually a knee).

Introduced through a tiny incision, the arthroscope enables surgeons not only to localize a problem and plan repairs but also to rule out surgery if conservative rehabilitation seems more advisable.

On occasion, the surgeon removes loose objects during an arthroscopy. He can even perform other operations through a tiny incision.

Most injured athletes cannot wait to return to competition. To shorten the wait, early diagnosis is essential. By looking into a knee joint with an arthroscope, the surgeon can more accurately assess an injury.

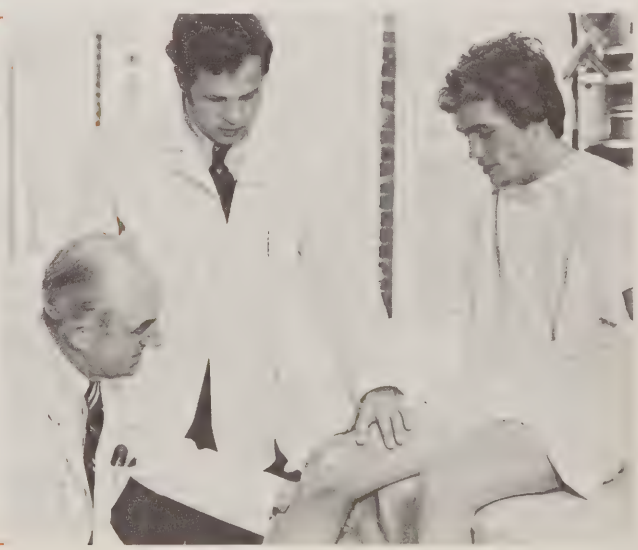
Dr. Patel has been involved in making such decisions for professional athletes. Early diagnosis helped rule out surgery for Wayne Cashman and Don Marcotte of the Boston Bruins hockey team. On the other hand, prompt arthroscopy led to early corrective surgery on the knees of New England Patriots' football player John Smith and tennis professional Janet Newberry.

Development of special instruments by Dr. Patel for this kind of work is also under way.

The Sports Medicine Clinic has an-

(Concluded on Page 4)

A week after surgery on a knee cartilage torn in a hockey game, Kevin Prowse of Wakefield, Mass., is informed by Drs. Rowe and Zarins that he is well enough for discharge.



Seeking Earlier Signs of Ovarian Cancer

(Continued from Page 1)

He succeeded Dr. Howard Ulfelder, who can now devote increased time to another important role as Deputy to the MGH General Director for Cancer Affairs (*MGH News,* February 1974).

Dr. James H. Nelson, Jr.

"The ovarian cancer problem is really a big one," said Dr. Nelson. "We'll be working on it probably with more intense interest than any other research project.

"Currently, about 85 percent of ovarian cancer patients, upon diagnosis, are in such advanced stages of the disease that only about 12 percent of this group survive five years. Almost all ages are involved."

Also earmarked for special research attention will be advanced cervical cancer, which is expected to claim some 7,700 lives this year in the United States.

Changes in the immune mechanisms of pregnant women constitute another area of forthcoming study.

"We want to know," said Dr. Nelson, "why these mechanisms don't reject the fetus and placenta, which in reality represent a degree of foreign material from the father.

"Why also don't these bodily defenses turn away malignant tumors of the placenta [choriocarcinoma]?

"Learning more about these immunological changes might not only help in the treatment of choriocarcinomas but also provide answers to infertility or population-control problems. The study has broad possibilities."

In addition to his MGH appointment, Dr. Nelson will serve in a dual capacity with Dr. Ulfelder as Joe Vincent Meigs Professor of Gynecology at Harvard Medical School. Dr. Ulfelder, first appointee to the Meigs Chair, will retire in 1978.

The Meigs Chair was established by the President and Fellows of Harvard in 1962 to honor a Clinical Professor of Gynecology who served as Chief of Staff of the Vincent Memorial Hospital from 1931 until his retirement in 1955.

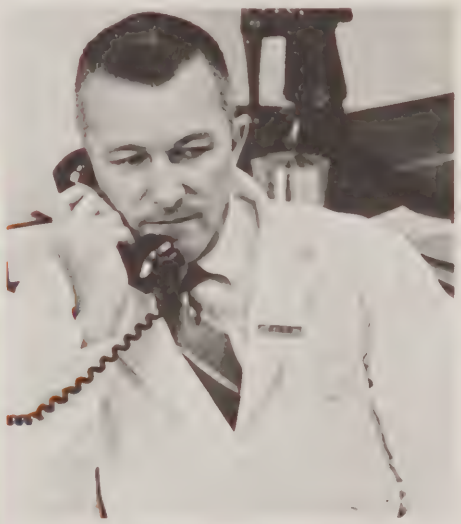
Founded in 1890 to treat diseases of women, the Vincent Memorial became a part of the MGH in 1941.

While Dr. Nelson's research will form an important element of his MGH work, his patient-care role will predominate. Part of this aspect will manifest itself indirectly through an improved teaching program.

Dr. Charles A. Sanders, MGH General Director, said Dr. Nelson's hospital appointment is a prelude to the development of new educational programs necessary to bring gynecology at the hospital more directly into the mainstream of the specialty and to develop leaders at a national level.

"Considering the caliber of people who train at the MGH," Dr. Nelson said, "the chances of developing potential leaders in this field are excellent."

In the past, general surgical residents have rotated through the gynecological service for brief periods of time. Plans now call for specialized training in gynecology and obstetrics.



Predicts new leaders

Ambulatory-care treatment is expected to improve with the involvement of physicians whose principal interest is the care of women and their special health problems.

"While we don't intend to establish a labor and delivery service at the MGH," Dr. Nelson said, "it is our hope that residents will be able to obtain their postgraduate obstetrical training under an arrangement with the Boston Hospital for Women and their postgraduate gynecological education here at the MGH."

Sports Medicine

(Concluded from Page 3)

other major assist in a highly sophisticated machine which tests the power, strength, and endurance of joints. It is also used to rehabilitate a limb following surgery or an injury.

"We are using the device to conduct a preseason evaluation of some 40 members of the Boston Bruins hockey team," Dr. Zarins said. "We plan to screen everybody's knees for possible weaknesses and also study other joints if they have once been injured."

Dr. Zarins recently was appointed to the Bruins' medical staff. He is serving with Drs. Earle W. Wilkins, Jr., and Ashby C. Moncure, MGH general surgeons. Dr. Rowe is the orthopedic consultant to the team.

Notwithstanding the elaborate safety precautions taken, the Bruins over the past two years alone have sent a number of injured players to the MGH. Among them were Bobby Orr, Phil Esposito, Doug Gibson, Brad Park, Bobby Schmautz, and Joe Zanussi. Most had knee problems repaired by Dr. Rowe.

From professional football, the MGH operated on Jon Morris of the Patriots and Lynn Dickey of the Houston Oilers. Tennis star Bob Lutz had knee surgery here.

Heavyweight boxing champion Muhammad Ali was treated at the MGH for an injured hand. A number of jockeys are among other professional athletes who have received therapy.

Much criticism has been heard about the lack of adequate medical presence at many schoolboy and intercollegiate sports events. Drs. Patel and Zarins hope to organize fellow physicians interested in going to games and serving as team doctors.

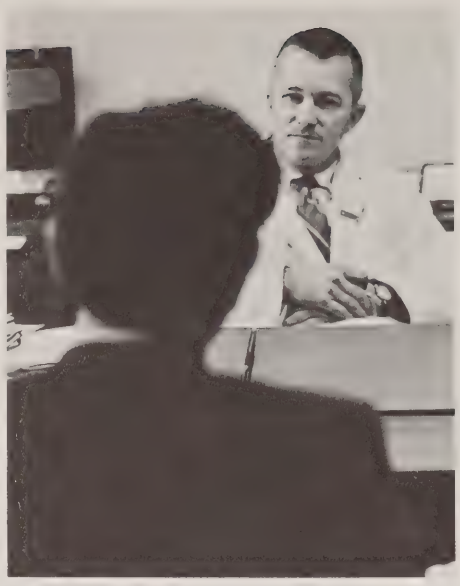
"Physicians should be there when the injury occurs and evaluate it on the spot," Dr. Patel said. "That's what sports medicine is really about."

The MGH maintained an obstetrical service for many years but discontinued it in September 1952. In the face of a declining birthrate and adequate maternity facilities elsewhere in Boston, good health-care planning, including a watchful eye on patient costs, allowed no alternative.

Dr. Nelson, who was brought here to effect the new programs, was born in Marietta, Ohio, 50 years ago. He earned his B.S. degree from Marietta College in 1949 and M.D. degree from New York University-Bellevue Medical Center in 1954, and then entered the Navy.

The doctor was fortunate in being able to train at the St. Albans Naval Hospital on New York's Long Island. It was the cancer center for the armed forces on the east coast, and he was particularly interested in studying cancer.

After his naval service Dr. Nelson became associated with the State University of New York and its Downstate Medical Center.



Discusses new programs

He is the author of *Atlas of Radical Pelvic Surgery,* first published in 1969 and now in its second edition; chapters in four other medical volumes; and 51 articles in various scientific journals.

A founding member of the Division of Gynecologic Oncology, American Board of Obstetrics and Gynecology, and of the Society of Gynecologic Oncologists, Dr. Nelson has also served as president of the New York Obstetrical Society and the Brooklyn Gynecological Society. He is affiliated with numerous other scientific organizations.

His wife, the former Barbara Singleton, holds a Master's degree in Library Science from C. W. Post College and hopes to engage in volunteer work in this field in the Boston area.

They have two children, James H. III, 29, Chief Resident in Urology at Ohio State University Hospitals in Columbus, Ohio, and Jonathan M., 24, an editor with a New York publishing house.

He Fought Pain and for Patients' Rights

"It is unusual for a researcher in medicine to achieve international eminence in even one field. It is extraordinary when that same researcher becomes a pioneer in still another field."

This was part of a citation that accompanied an award given this summer to Dr. Henry Knowles Beecher, who served as Chief of Anesthesia at the MGH for 33 years.

The Institute of Society, Ethics and the Life Sciences paid tribute to Dr. Beecher for combining devotion to the highest ideals of scholarship and research with a dedication to ethical inquiry.

Due to illness, Dr. Beecher was unable to travel to Hastings-on-Hudson, N.Y., to accept the plaque at an Institute meeting. On July 25 he died at his Beacon Hill home in Boston.

Ironically, the honor accorded the 72-year-old researcher and educator was a dual one. He was the first recipient of this national prize bearing his own name – the Henry Knowles Beecher Award for Contributions to Ethics and the Life Sciences. The award will now become a memorial to him.

Dr. Beecher won renown in anesthesia while serving as head of that department at the MGH from 1936 to 1969 and as Henry Isaiah Dorr Professor of Research in Anaesthesia at Harvard Medical School, his alma mater, from 1941 to 1970.

The Dorr professorship is the oldest endowed chair in anesthesia in the world.

In addition to his work in this field, Dr. Beecher became a medical consumer advocate long before the consumer-advocacy movement gained popularity.

He was a distinguished-looking man who wore dark-rimmed glasses which contrasted with his shock of white hair. A bulldog of a fighter, he clung to whatever cause he espoused until he achieved his results. Opposition merely stiffened his resolve.

During the 1960s he expressed deep concern about the problem of ethics in human experimentation. He charged that "informed consent" was often absent or inadequate and that the experimental risk was not always justified by the information obtained. Investigators around the country often chafed at his comments.

"A study is ethical or it is not at its inception," he insisted. "It does not become ethical because it succeeds in producing valuable data."

Through a series of articles as well as a book, *Research and the Individual,* published in 1970, Dr. Beecher persuaded the medical profession and the public to deal squarely with the issue.

Partly in response to his campaign, the MGH created one of the first committees charged with protecting the rights of patients and other volunteers involved in human studies.

Today, all institutions that receive federal funding for human studies must guard the rights of research subjects or risk the loss of the financing.

In 1968 Dr. Beecher once more plunged into a sensitive ethical issue when he chaired a Harvard Medical School committee that set medical guidelines for physicians and hospitals in defining brain death or "irreversible coma" involving persons with no discernible central-nervous-system activity.

Such definitions were deemed necessary in the event controversies arose as a result of obtaining organs for transplantation and because technology was permitting medicine to keep the heart of a dead person beating.

Besides his concern with the philosophy of research and the ethics relating to the dying patient, at an early stage of his career Dr. Beecher became absorbed in the world of his own research.

It was shortly after he was named Chief of Anesthesia at the MGH that he opened the first laboratory devoted solely to the study of anesthesia and related problems.

The windowless, 7-by-9-foot room was in the attic of the Bulfinch Building and only a few yards from the Ether Dome where, on an October morning in 1846, Dr. William T. G. Morton conducted the first public demonstration of the use of anesthesia in surgery.

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Weight Gain Alone Won't Cure an Anorectic

(Continued from Page 8)

He strictly enforces "the rules," monitors the patient's activities, and is often viewed by the patient as the "tough guy." A psychiatrist, the "nice guy," tries to reach the patient's emotions, while a social worker counsels the family.

The trio is in constant communication with everyone involved in the care of the anorectic.

"We form a circle of protection around the patient," said Mrs. Adele Goldstein, social worker. "Because we are consistent and cohesive in our treatment, the child gets the message that we care."

Care was evident in a meeting of nine staff members one weekday afternoon to discuss treatment of an unusually young anorectic, a 10-year-old girl who was hospitalized in the Burnham Building, the MGH's pediatric section. Seated at a large conference table with Dr. Bode were a psychiatrist, a social worker, a head nurse, two staff nurses, a resident in pediatrics, and two dietitians.

For an hour and 15 minutes they exchanged notes on the child's progress and debated, often vigorously, the wisdom of changing her "token system" (a reward plan) to prepare for discharge. They had met nearly every week since her hospitalization three months previously. Smaller conferences included her parents.

The token system, a form of behavior modification used primarily in psychiatric institutions, was adapted to meet this child's particular needs.

"The patient had three sheets of tokens," Dr. Bode explained, "with a list of how she could gain and spend them. For any normal behavior – eating, interaction with others, taking a bath – she earned points. For weight loss, she lost them. She could spend the tokens for privileges like going to the lounge or visiting home."

Though the method seems extreme, behavior therapy has proved an effective way to bring the patient out of the most dangerous stage of the disorder. Finding strict bed rest intolerable, the overactive anorectic will "eat her way out of the hospital."

But one world authority on anorexia nervosa, Dr. Hilde Bruch, Professor of Psychiatry at Baylor College of Medicine, Waco, Tex., stresses that this method, continued too long and without other therapy, can prevent a genuine recovery. In both the children's and adult services at the MGH, individual psychotherapy as well as family therapy is usually recommended, and the patient is carefully followed for months or years on an ambulatory basis.

On the Adult Psychiatric Service, where Dr. Slovik treated Jane, a reward system and team approach, similar to that developed by the pediatric service, are employed along with several types of therapy. Using a "T/A [therapist/administrator] split" for Jane, a psychiatric nurse provided a secure outlet for the child's feelings while Dr. Slovik, the administrator, monitored her weight, granted privileges for pounds gained, and coordinated the therapy.

Dr. Slovik believes that family therapy is essential if the patient is to make lasting changes.

"Family structure is a lock-and-key arrangement. Once you change the lock, the key no longer fits," she said. "Jane's illness served a purpose for each family member. For example, it allowed her parents to evade serious problems in their marriage."

In sessions including Jane, her parents, a social worker counseling the parents, and Dr. Slovik, the family was encouraged to communicate and interact. As Jane began to view the family relationships more realistically, she was able to assert her independence in ways other than through her body.

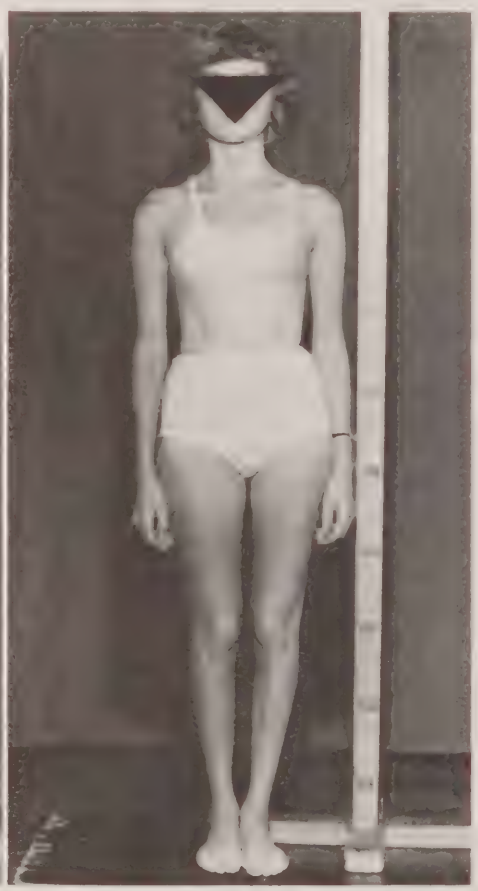
Her return to regular eating patterns, to college, and to a normal social life paralleled an improvement in her parents' relationship.

About a third of the victims of anorexia nervosa never fully recover. Dr. Norman R. Bernstein, Director of Child Psychiatry at the MGH and Assistant Professor of Psychiatry at Harvard Medical School, recalls diagnosing anorexia nervosa in a child whose mother had been hospitalized for the disorder decades previously. The mother's weight was still in the 70s.

"Many anorectics continue to have emotional problems and peculiar eating habits," he said. "They may maintain a very low weight for years, going through college and into professions, usually unhappy, lonely people who are childlike emotionally but intellectually effective."

What causes anorexia nervosa? For

This 17-year-old anorectic patient weighed 73 pounds when she first visited an MGH endocrinologist. She is 5'3" tall.



Nine months later, after a month's hospitalization and regular ambulatory care, she weighed 97 pounds.

decades researchers have sought an explanation. Twenty-five years ago, when Freud's teachings were more predominant, fear of pregnancy was a popular theory; it was believed that the adolescent unconsciously confused eating with impregnation. The theory broadened to include a denial of sexuality, a rejection of womanhood, and a fear of growing up.

Some researchers have viewed this self-starvation as the child's way of remaining dependent on her family. Currently, however, it is more often seen as part of a struggle for independence, a method of magically trying to gain control over oneself and the shape of one's body.

"Anorexia nervosa is the final funnel for a variety of things," Dr. Bernstein said. "That's why it is so hard to say that 'X' causes 'Y.' "

No one is sure how common the disorder is. Some anorectics are treated successfully on an ambulatory basis. Others, having borderline conditions, may never seek treatment.

"The mildly affected patient may outgrow it naturally," Dr. Bernstein said, "to the point where she can look back and say, 'What was that all about? It seems so silly!' "

From 1962 to 1972, an average of only eight anorectics were hospitalized at the MGH each year. Since then, the average has shot up to 17 each year, but this may be a result of greater awareness among physicians and the public.

Some physicians make a diagnosis of anorexia nervosa only when the classic symptoms are present, including a 25 percent loss of original body weight. Others use the same term for milder forms of the disorder. They would agree with Dr. Anne P. Forbes, an MGH endocrinologist, who said, "There is one in every large high school, one in every freshman class of college. It is a common condition in any group of young women."

Battlefields Figured in Pain Research

(Concluded from Page 5)

Dr. Beecher liked the symbolism that could be drawn from the juxtaposition of the laboratory and the Ether Dome. "There are many places for laboratories," he said, "but for me the one in proximity to the sick man takes first place."

Dr. Beecher's research focused on analyzing the effectiveness and safety of anesthetic and pain-relieving agents.

He was the first to show that during chest surgery, carbon dioxide tension often reached deadly levels. By establishing and simplifying the anesthesia to be used, he increased the safety of such operations.

Many of his investigations of pain were conducted on war-torn beaches in Italy and Korea. His findings later became a part of standard medical teaching.

While serving with the U.S. Army as a consultant on anesthesia and resuscitation, he discovered that morphine poisoning may occur when several normally safe injections of the drug are given to an individual who is chilled or in shock. Further, he observed that in instances of severe shock, wound pain is usually absent, and morphine is not required.

For pointing the way to safer uses of morphine among battle wounded, he earned the Legion of Merit in 1945. Six years later he was named a Chevalier of the French Legion of Honor for developing synthetic agents to replace morphine.

He also conducted extensive studies on placebos, nonmedicated pills or injections often used as "controls," in an attempt to rule out psychological factors in experiments. He found that the nonmedication seemed to reduce pain in a third of the people. In fact, he reported, the severer the pain, the better the placebos seemed to work.

Among battle casualties the doctor encountered at Anzio Beach in Italy during World War II, only 25 percent of the severely wounded required painkillers.

"Most people think that the severity of pain is in direct relation to the extent of the wound," he said. "This is not so. We know that emotion can block pain."

To the wounded servicemen, the initial anguish and fear often became secondary to another reaction: the injuries were a ticket away from combat to a quiet hospital and possibly home. The harm the men suffered actually produced a sense of "euphoria."

Dr. Beecher trained more than 300 anesthesiologists. Many are now professors. He authored nine books and more than 260 scientific articles.

The last book, *Medicine at Harvard,* written in collaboration with Dr. Mark D. Altschule, is expected to be in press shortly.

Dr. Beecher amassed many tributes during his career, including two honorary degrees, an award for distinguished service to humanity from the University of Kansas where he earned his A.B. and A.M. degrees, and, on the 150th anniversary of the MGH in 1961, designation as one of the hospital's 15 "outstanding alumni."

Dr. Henry K. Beecher

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Anorexia Nervosa: Starvation With a Purpose

The patient was relentless in pursuit of her "habit." Those who tried to help she viewed as antagonists. Increasingly isolated, she developed a distorted sense of reality.

Portrait of a drug addict? Alcoholic? No, the patient had anorexia nervosa, literally, nervous loss of appetite. Her "habit" was self-starvation; her source of pleasure – a body so thin that others found it grotesque.

Awareness of this baffling psychiatric disorder is increasing among both medical and lay people. While the symptoms of anorexia nervosa are strikingly consistent, there is no consensus among specialists on how to treat it or why it develops in apparently normal young women.

Occurring primarily in females under the age of 25, it is seen infrequently in males and seldom develops before the age of 12.

The challenge of treating an anorectic was described at an MGH medical meeting (Psychosomatic Conference) by Dr. Lois S. Slovik, a pediatrician and third-year resident in psychiatry.

When Dr. Slovik saw "Jane," the young anorectic was being admitted to the hospital for the second time. Typically, she was a model child, an achiever from a highly educated, though unaffectionate, family. A change – going off to college – precipitated her dieting.

From 122 pounds her weight dropped to 95 before a family member noticed the loss. When first hospitalized, she weighed 77; but at her discharge, the scale read 90.

"Jane later told me how she 'gained' the pounds," Dr. Slovik said, "– by drinking gallons of water and putting heavy objects in her shoes and mouth before being weighed."

The anorectics' self-destructive drive is so overpowering that they will sabotage the efforts of the most perceptive physician. Though eating under constant supervision, they will find ingenious ways to dispose of food.

Dr. Slovik assessed Jane's dieting as a struggle to establish competence, identity, and control. Feeling hopelessly inadequate in most areas, the young woman starved herself to prove that she could control at least her body.

As distinct from other eating disorders, in anorexia nervosa the patient frequently has a keen appetite ("anorexia" is a misnomer), thinks obsessively about food, and is often an excellent cook.

Raging within is a battle of will against temptation. In a "weak" moment the patient may go on a binge, consuming huge amounts of gourmet food, then inducing vomiting. Use of laxatives and diuretics (to increase urination) is also common among anorectics.

Dr. Hans H. Bode, pediatric endocrinologist, checks weight and well-being of a young anorectic patient returning for outpatient care after a long hospitalization.

Estimates of the mortality rate for anorexia nervosa range from 5 to 15 percent. The knowledge that they could die, however, does not alter the anorectics' behavior. Both their sense of reality and perception of body image become distorted. Viewing photographs of Biafrans suffering emaciation, one patient claimed they were "beautiful."

Despite their weakened condition, many anorectics engage in strenuous activity like jogging and extensive walking.

A prominent physical effect of anorexia nervosa is failure to menstruate (amenorrhea). Other characteristics include slow heart rate, low body temperature, and growth of the type of downy hair found on fetuses after five months and on emaciated people.

Among the causes of death are congestive heart failure, infection, and suicide.

Dr. Slovik cited from the world's medical literature the incident of a patient who dutifully gained the weight desired by the doctor and then committed suicide. She couldn't tolerate being "fat."

"You haven't cured anorexia unless you change the psychodynamic issues," Dr. Slovik said.

How do you treat an illness in which the physical and psychological factors are so entwined?

In the MGH Children's Service (Burnham Division for Children), specialists from several fields have developed a team approach tailored to the individual patient. It requires enormous effort but seems to work.

Dr. Hans H. Bode, a pediatric endocrinologist at the MGH and Associate Professor of Pediatrics at Harvard Medical School, explains how the team functions:

The pediatrician heads the team and ensures that the treatment is consistent.

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MGH News

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Staying in Top Physical Shape Takes Some Doing

Speedier Testing Helps to Conquer Viruses

Two years ago, a six-year-old boy was admitted to the MGH with an acute inflammation of the brain and spinal cord. Laboratory testing of the child's spinal fluid uncovered the virus of eastern equine encephalitis.

On admission the boy was already too ill to be saved, but prompt identification by the hospital of the deadly, mosquito-borne virus set in motion a public-health alert and a spraying program to prevent spread of the disease.

In another instance, several weeks after purchasing a hamster at a local pet shop, a 36-year-old Boston man was hospitalized with meningitis. His mother-in-law, who lived in the same household, was admitted a day later.

From the spinal fluid of both patients, MGH virologists isolated a virus, lymphocytic choriomeningitis, rarely contracted by humans.

Laboratory examination of the hamster confirmed that it had been carrying the virus. The findings led to a temporary prohibition of hamster sales in Massachusetts until the source of the infectious agent could be found and eradicated.

For the two patients, meantime, speedy recognition of the virus permitted curtailment of further diagnostic procedures and resulted in a shortened hospitalization.

MGH records disclose numerous patients who enjoyed an early return to good health and avoided unnecessary medical expense because of viral studies which quickly pinpointed their illnesses.

Until this year, viral investigations were conducted on an informal basis at the MGH. With diagnostic facilities available at the State Virus Laboratory in Boston, only a relatively few specimens, ones requiring particular and immediate attention, were processed in the hospital.

Dr. Martin S. Hirsch, MGH physician in the Infectious Disease Unit, and Lawrence J. Kunz, Ph.D., Director of the MGH Bacteriology Laboratory, felt this arrangement was inadequate.

Cognizant of the importance of speed in determining the specific nature of certain viral infections and of the potential to improve patient care through research, Drs. Hirsch and Kunz initi-

(Continued on Page 4)

Nearly 1 in every 10 participants in this year's Boston marathon was a physician. Dr. Matthias B. Donelan (right), MGH surgical resident, nears the finish line.

The late Dr. Paul Dudley White, MGH cardiologist, once warned that the chief hazards of a married man over 25 are his automobile, his television set, and a wife who cooks too well.

Walking a few miles daily, eating less, and working harder, he said, would do more than all the new medicines or new operations in the world.

One does not have to be too advanced in years to recall when a heart-attack patient was immobilized in bed for six to eight weeks. To avoid stairs, he might then have to sleep in his dining or living room. If his job entailed any physical exertion, his prospects for returning to that position diminished greatly.

Medical thinking since then has taken an almost 180° swing. Today bed stay averages only two or three weeks. In uncomplicated but definite instances of myocardial infarction (heart attack), an MGH study has shown no apparent additional benefits to patients hospitalized three weeks as compared to those confined for two weeks.

A slow walk up the stairs is often encouraged now as invigorating to the heart. And doctors generally agree that the sooner a heart patient returns to his job after recovery the better will be his chances of complete rehabilitation.

To regain their health or to keep fit, people are turning increasingly toward exercise, preferably so-called endurance-type activities such as bicycling, swimming, jogging, or simply brisk walking. Regardless of the activity, the game plan is the same: sustained move-

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EDITORIAL:

How Use Doth Breed a Habit in Man

Compared to Europeans or Asians, Americans can hardly be called traditionalists. To a great extent our indifference to the past results from the fact that we measure time in scores of years rather than milleniums. Even our country itself has just celebrated its 200th birthday – a proud achievement – but from a purely temporal viewpoint not long in terms of a China or Egypt. In part, our relative aversion to dwelling in the past might explain the failure of our Bicentennial to achieve its goal of greatly stimulating tourism.

However, if our traditions are of recent origin, our habits are rooted rather deeply.

Just try to complement football with Europe's and South America's most popular sport – soccer. Or try to introduce the metric system to replace our English weights and measures.

An article in this issue of the *News* compares metric and English measures. In truth English measurements were founded on whim and perpetuated in obstinacy. Other than habit, conversion costs, and a rather difficult period of transition, there is little to recommend a system that derived some of its measures from the capriciousness of the royal family. As a consequence, trying to figure in acres, inches, and ounces is really a needlessly difficult chore.

On the other hand the metric system is rationally bound to the same decimal system that we use to such good advantage in counting money. The logic of the decimal point has made our business transactions mathematically simple. So simple that the first-time visitor to England invariably cursed the diabolic act which until recently led the British to compute their currency in a nondecimal form of pounds, guineas, shillings, and various fractions of pennies. Somehow we have managed to curse the English for their absurd currency while blindly adhering to their equally preposterous system of weights and measures.

Now even Great Britain has seen the folly of its own weights and measures and is wisely succumbing to the simplicity of metrication. That leaves the United States, which has opted for voluntary conversion, isolated as the last major holdout for inches and yards, ounces and pounds, pints and quarts, and all that complicated nonsense. Even the Mayan Indians of 1,500 years ago knew better than that.

The Heart Operates More Efficiently After Appropriate Exercise

(Continued from Page 1)

ment. Regulating the throttle is the responsibility of the physician.

"Most people unfortunately lack the willpower to stick to a proper exercise format," said Dr. Charles A. Sanders, MGH General Director and cardiologist.

"A person who exercises only on weekends might wear himself out and hurt rather than help his heart. Also, because of the protected feeling that exercise has given him, an unsupervised individual might feel tempted to do things deleterious to his health."

Dr. Timothy E. Guiney, MGH cardiologist and Director of the hospital's Treadmill Exercise Laboratory, warned that if a person is in questionable health or past 30 years of age, it is essential that he know where to draw the line on physical activity.

"Only a medical examination can safely pinpoint where an individual's physical limits lie," he said.

What does exercise do for you?

"Exercise produces the so-called training effect," Dr. Guiney explained. "Basically, this is the ability of the heart to work more efficiently under any given less-than-maximal work load after a period of appropriate physical training.

"For example, if one bicycled, swam, jogged, or walked three or four times a week for several months, he would find himself performing the same task at a lower heart rate and lower blood pressure than when he began."

A similar principle may help certain of those people suffering from a severe chest pain (angina pectoris) which is related to an inadequate supply of blood to the heart.

If a person is subject to angina pectoris at a given heart rate and blood pressure, the increased capacity produced by the training could diminish the chances of the pain recurring.

This reduced susceptibility to chest pain may result from increased col-

Photographs: Page 1, Lorraine Donelan; p. 3, MGH Photo Lab; pp. 4, 5, 7, Joel Salhanick; p. 6 (upper), courtesy of Dr. David R. Sigelman, (lower), courtesy of Dr. Lewis B. Holmes; p. 8, Donald Robinson.

Next to bicycling, the favorite pastime of the late Dr. Paul Dudley White, MGH cardiologist, was recruiting others to take up the same exercise.

lateral circulation. In other words the demand of the body for more blood during exercise forces the creation of new arteries to supply the heart with more blood to cope with the added work load.

Stress testing in a laboratory like Dr. Guiney's provides a basis for judging the proper limits of one's exercise schedule.

"We ask a patient to walk on a treadmill while a cardiologist stands alongside measuring his blood pressure once a minute and monitoring an electrocardiograph," Dr. Guiney said.

"From this we can learn how the individual's blood pressure reacts under stress and whether during physical exertion there would be a likelihood of changes in heart rhythm. Such changes could be sudden and devastating.

"An 'exercise prescription' can be provided for the patient based on his heart-rate and blood-pressure responses in the laboratory.

"An exercise test can also help uncover asymptomatic [symptomless] or presymptomatic coronary disease, which seems to be appearing in younger and younger age groups in this country."

Six years ago, Dr. Guiney helped to establish a postcoronary program at the Cambridge, Mass., YMCA. Aided by a grant from the Greater Boston Chapter of the Massachusetts Heart Association, the program sought through carefully controlled exercise to help people recover from heart attacks.

Still going strong, the Cambridge endeavor lists some 25 members ranging in age from 30 to 65. Three mornings a week, they work out under the watchful eye of a cardiologist or coronary-care nurse.

Each participant has his own exercise prescription specifying activities within certain limits. In addition to calisthenics to loosen up, some people jog. Some engage in fast walking. Some just walk at a normal pace. A number of the participants have taken part in the open-ended program since its inception.

To promote the value of exercise nationally, several hundred members of the medical fraternity have banded together under a banner reading, "American Medical Joggers Association."

Nearly 1 of every 10 runners in this year's Boston marathon was a physician. The roster included three MGH doctors.

Dr. John C. Long, a pathologist, covered the 26-mile, 385-yard route for the fifth time. Because of searing heat, he finished in 3:08.29, some 18 minutes off his best time, posted in 1975. Dr. Long runs in a marathon on an average of every six weeks.

Drs. Stephen E. Hedberg and Matthias B. Donelan, both surgeons, entered the Boston classic for their first time last spring. Dr. Donelan surprised even himself by crossing the finish line in under four hours. As for Dr. Hedberg, he remarked proudly, "I came in on April 19th, the same day I started. If I can do it, anyone can."

Dr. Hedberg took up jogging two years ago at the age of 45 when he realized that a busy and involved work schedule was beginning to affect his health.

The 183 pounds he had maintained on his 6-foot, 4-inch frame as an undergraduate on the Harvard crew had ballooned to 236 pounds. His cholesterol count had climbed from 175 milligrams percent to 205, not a dangerous level but a sufficient increase to warrant concern.

As a result of exercise and the shunning of high-cholesterol foods, Dr. Hedberg entered the marathon at his college weight. In addition, his cholesterol level dropped to 159.

On four or five mornings each week, the doctor arises at 5 and trots over to Jamaica Pond near his Brookline, Mass., home to jog three to six miles around the pond. He finds the exercise stimulating, both physically and mentally.

"To do a good day's work, even in a sedentary occupation, a person out of shape might have to expend as much as 80 percent of his energy," Dr. Hedberg said. "An individual in good condition, on the other hand, might use only 20 percent of his capacity."

Although physicians concur on the value of exercise as a general body conditioner, the question of whether such activity can prevent heart disease remains far from settled.

Theories abound. While not a heart specialist, Dr. Hedberg subscribes to the belief that exercise may well protect against coronary-artery disease if the physical activity is prolonged and maintained at a constant rate.

"The objective is to lower the blood levels of certain lipids [fats] which pose a threat to the coronary vessels," he said. "To accomplish this requires a chain of events that only prolonged, vigorous exercise can generate.

"Muscle energy comes first from glycogen, a carbohydrate stored in the muscle. When the glycogen stores begin to diminish, the muscles then seek energy from fatty acids derived from pre-beta and beta lipoproteins [substances in the blood that are part protein and part fat].

"The pre-beta and beta lipoproteins are the villains in arteriosclerosis, while an increase in the level of a different lipoprotein, alpha, is associated with a decreased risk of coronary-artery disease. The exact mechanisms by which exercise relates to high alpha, low beta, – and presumably, a lower

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Always Be Aware of Your Exercise Limit

(Concluded from Page 3)

risk of heart attack – are not well understood."

Dr. Hedberg argues, however, that any exercise program capable of lowering the pre-beta and beta lipoproteins and raising the alphas should be a positive force in averting coronary-heart disease, and he is unwilling to wait for absolute proof when his own life may be at stake.

It has been proved that muscles begin switching from glycogen to fat as a fuel source after about a half hour of steady, vigorous exercise. After 45 minutes, studies show, fats will account for about half the energy utilization, so that this duration should be about right to achieve a beneficial effect on lipid metabolism.

"To judge whether you're jogging, walking, or cycling at the proper rate," Dr. Hedberg said, "try chatting with someone exercising nearby. If you're so breathless that you can't converse, it's time to slow down. Don't try this test while swimming – though that is also an excellent exercise."

Physical-fitness programs are numerous and claims of their relative effectiveness are often contradictory. One major source of confusion is that "fitness" may be defined in terms of body beautiful, endurance, brute strength, agility, immunity to heart disease, or merely a sense of well-being. Exercise programs should define their objectives.

After observing the work habits of west-coast longshoremen over a period of years, two researchers reported that 20 or 30 minutes of physically stressful work appeared to produce a beneficial training effect on the cardiovascular system and some measurable protection against heart attack.

Still another study led investigators to believe that exercising three days a week for only 10 minutes at a time was sufficient to keep anyone in excellent "shape" – whatever that is.

While encouraging, research on the benefits of exercise and the best ways of exercising is inconclusive. Meantime, as those studies continue, one admonition is worth repeating:

If you are in questionable health or over 30, check with your physician before embarking on any exercise program.

Early Virus Testing Provides Best Diagnosis

(Continued from Page 1)

ated proposals to establish the hospital's own Virology Laboratory. After careful consideration the MGH's Resource Allocations Board (*MGH News,* June-August 1975) approved the plan.

Dr. Kunz provided the needed space, the Board furnished start-up money, and the Massachusetts Rate Setting Commission approved proposed fees for the work to be done. Steps then were taken to recruit a team.

Miss Bonnie Richter, MGH Virology Laboratory technician, emerges from walk-in incubator where controlled atmosphere facilitates the growing of viruses in culture systems.

"Miss Evelyn Keller came to the MGH two years ago after running a similar operation at the State University Hospital Upstate Medical Center in Syracuse," Dr. Hirsch said. "She has been senior technician in our virology lab since its inception earlier this year. Miss Bonnie Richter assists her."

When no great diagnostic urgency exists, the technicians process blood specimens for serum testing at the state laboratory. Sometimes the specimens are relayed to the U.S. Public Health Service's Center for Disease Control in Atlanta, Ga.

Two serum samples are required, the first collected during the acute phase of an illness and the second, three to four weeks after its start.

By studying a buildup of antibodies in the serum, virologists can determine the strain of virus responsible for the illness.

When the need to identify a virus is more pressing, efforts to isolate the agent are conducted in the MGH laboratory.

"We receive about 220 specimens a month," Dr. Hirsch remarked. "Of these, 90 to 100 stay at the MGH for virus isolations while the remainder are sent to the state laboratory for serology [serum] tests.

"Success in the isolation of viruses is heavily dependent upon proper collecting and handling of specimens. In most instances maximal amounts of virus are present early in the course of an illness; thus, any delay in gathering the samples will diminish the yield of positive results."

Because of limited space and staff, the laboratory requires that all virus isolations be initially ordered or approved by a member of the Infectious Disease Unit.

A flat rate of $70 is charged per patient isolation attempt. The tests often necessitate extensive examination of specimens that may include spinal fluid, throat washings. and stool. Serology processing costs $7.

The time required to isolate a virus varies considerably. Some viruses such as herpes simplex, the second most common cause of venereal disease in the United States, can be diagnosed in 24 to 48 hours.

Other viruses such as cytomegalovirus may take as long as six weeks to grow in the laboratory's tissue culture systems.

Evolving assays that will cut the diagnostic waiting time ranks high among the laboratory's goals.

Cytomegalovirus has been linked with a variety of clinical syndromes (groups of symptoms), such as hepatitis and pneumonia. Studies performed by the MGH also have shown this disease to be one of the most important factors in predisposing transplant patients to overwhelming bacterial pneumonia.

In general, transplant patients are highly vulnerable to viral infections. Since a donated organ is in reality foreign matter, a recipient must take drugs (immunosuppressives) to prevent his body from rejecting the transplant. In suppressing the body's natural defenses, however, the medication at the same time is lowering the patient's resistance to disease.

Financed by a research grant from the National Cancer Institute, the MGH

Contrasting Medical Care in Latin America

In this era of remarkable strides in medicine, can you visualize a country having a birth and mortality rate so high that 50 percent of the people are under 15 years of age?

This is the grim picture in Colombia, a South American republic of 24 million. Half of all deaths in Colombia are of children under 5.

The story of a nation struggling to provide its citizens with adequate health protection was told at an MGH medical meeting (Children's Service Grand Rounds) by Dr. David R. Sigelman. He interrupted an MGH pediatric residency last year to work 10 months in a university hospital in Colombia.

His description of poor health conditions in urban areas of that country preceded a contrasting report on public health in Cuba by Dr. Lewis B. Holmes, also of the MGH Children's Service.

Invited to Cuba by its government for two weeks to lecture on genetics and mental retardation, Dr. Holmes was impressed with the quality of that country's health system.

"Since the Castro regime came to power in 1959," Dr. Holmes said, "the Cubans have delivered health care to every neighborhood."

The health programs for Colombia and Cuba, a nation of 9 million, looked alike – on the drawing boards. They provided for basic medical care in neighborhoods, and complicated problems were attended to in intermediate-level, or regional, hospitals. Still more complex difficulties were referred to major specialized-care hospitals in key urban settings.

After starting off on the same theoretical footing, what then spelled success for one effort and continuing frustration for the other? The explanation is that Colombia lacks sufficient doctors while Cuba enjoys an abundance, so many in fact that for political reasons Fidel Castro has loaned the services of some to countries such as Algeria, Yemen, and Vietnam.

Prior to the 1959 revolution most medical services in Cuba were confined to private practice in large urban centers such as Havana and Santiago.

Cuba had one medical school. Today, it has three and boasts of an estimated 10,000 physicians, or one doctor for every 900 citizens. This compares with a ratio of one doctor for every 597 individuals in the United States. Colombia must limp along with one physician for every 2,286 persons.

Doctors in Cuba must devote three years to primary care in return for their medical education. Thus, through governmental assignment, even rural health centers can staff such key professionals as internists, obstetricians, pediatricians, and surgeons.

Almost all births in Cuba take place in hospitals. During a child's first year, he is examined in his home at least three times by a pediatrician-nurse team.

"In a new pilot program in Colombia, 80 to 90 percent of all health care is rendered in the home," said Dr. Sigelman, now a staff pediatrician at Cambridge City Hospital in Cambridge, Mass., as well as a Clinical Associate in Pediatrics at the MGH.

"More than half of all infant deaths in Colombia are associated with malnutrition and/or prematurity."

Dr. Sigelman worked in Cali, a city of 1,150,000. Just two miles away, thousands lived in squalor. Rain-filled

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Virology Laboratory is intensely studying the particular problems of transplant recipients.

"The majority of these patients contract some kind of significant viral infection at one time or another," said Dr. Hirsch, also an Associate Professor of Medicine at Harvard Medical School.

"Because they are at such a high risk, we are trying to find a drug capable of preventing or aborting these infections."

Protected by laminar-flow hood, Miss Evelyn Keller, senior technician in the MGH Virology Laboratory, puts urine into tissue culture to isolate suspected cytomegalovirus. A flow of filtered air across the hood opening prevents escape of the virus.

Most viral diseases do not respond to antibiotics or other medicinal agents, but Dr. Hirsch and his colleagues believe that it is only a matter of time before concerted research efforts will lead to a number of antiviral drugs.

"We're also doing other clinical studies," Dr. Hirsch said. "There is evidence that some diseases of unknown etiology [cause] may well be viral. We have been looking into conditions such as multiple sclerosis, lupus erythematosus, and a number of different leukemias and lymphomas to see whether they have any connection with certain viruses."

To date in the constantly expanding field of virology, vaccines undoubtedly represent the greatest research achievements.

Smallpox, a viral disease with no known treatment but totally preventable by vaccination, has been virtually eradicated on this planet.

Effective vaccines also are available to protect against polio, measles, rubella (German measles), influenza, yellow fever, mumps, and rabies viruses. The list goes on.

This rain-filled ditch provides drinking and bath water and also carries away sewage in a village only two miles from the large Colombian city of Cali.

Colombians Rely on Home-Health Aides

(Continued from Page 5)

ditches provided drinking and bath water and also carried away waste.

"The principal deliverer of health care in the area served by the pilot program," Dr. Sigelman told his colleagues, "is a home-health aide, generally a woman living in the region who has had some high school education and a couple of months of on-the-job training. Serving about 2,500 people, her salary comes to $360 a year. Each home visit costs 14 cents.

"Nursing assistants, who attended high school and have had two years of special nurses' training, staff the neighborhood health centers. Each assistant oversees the health of 5,000 to 7,000 residents and earns a bit over $800 a year.

"The aides perform first-aid work, treat conditions such as diarrhea or dehydration, manage the minor complications of pregnancy, and conduct family-planning clinics. They also visit homes periodically to check on newborns.

"Midwives handle low-risk births. At least two-thirds of all deliveries take place in the home. The midwives receive about $3 compensation for each delivery. Complicated or emergency cases are referred to a regional or university hospital."

The infant mortality rate in Colombia stands four times higher than in the United States. In his talk about Cuba, Dr. Holmes reported that the infant-death figures at one clinic he visited were comparable to the United States level. He had no statistics for Cuba as a whole.

"Cuba boasts 12,000 hospital beds for children," said Dr. Holmes, an Assistant Professor of Pediatrics at Harvard Medical School. "People remember when epidemic diarrhea was their main medical problem. Today they brag that their country's infant mortality rate from diarrhea is quite low."

Cleanliness is a major public issue on the Caribbean island. "You no longer see hovels in Havana," Dr. Holmes said. "There are many new apartment buildings both in the cities and in the countryside.

"Proper nutrition also commands high priority. The government guarantees one quart of milk a day for every child under 7 and every adult over 65."

A private surgical dispensary in Havana that catered to the affluent was expropriated by the government after the revolution and today, under the direction of a former MGH resident, serves as a 100-bed neurology hospital.

A former MGH resident, Prof. Raphael Estrada, is director of this fully staffed neurology hospital in Havana.

Professor Raphael Estrada trained in neuropathology at the MGH in 1945. At the hospital he now heads there is a large staff of neurologists and neurosurgeons. After the revolution in 1959 six of the seven neurosurgeons in Cuba left. Now there is an abundance of neurosurgeons trained primarily in Cuba.

Dr. Holmes emphasized that the abundance of doctors in Cuba does not mean the country is free of medical difficulties.

"It has not yet instituted some public-health procedures," he said, "possibly because of the cost of the equipment that would be needed.

"For example, streptococcal infections, especially sore throats, and skin infections like impetigo are common in rural areas where no facilities exist for taking routine bacterial cultures.

"Another example is a lack of fluoridation of the water, a proven means of greatly reducing dental decay in children.

"Other public-health measures we take for granted in Massachusetts, such as testing the blood and urine of each newborn for evidence of rare, treatable, metabolic diseases, are not considered priority items at this time in Cuba."

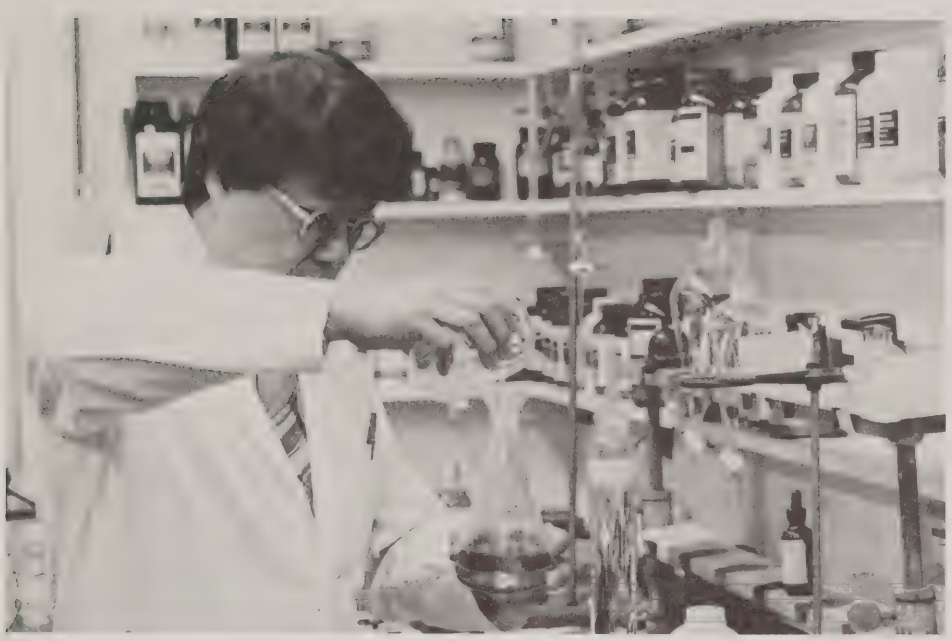
The cost of medical equipment coupled with the United States economic embargo has severely restricted medical research in Cuba.

"I visited a very modern research building just outside Havana," Dr. Holmes remarked. "But although it was very impressive on the outside, the structure did not have laboratory facilities that we would consider routine.

"Five percent of the doctors who graduate from Cuba's medical schools each year elect to pursue research. Some are sent to places in eastern and western Europe for advanced training, but when they return, eager to work, the facilities are simply not available for them to engage in any first-rate research."

Some new medical equipment made principally in Japan, Sweden, France, and eastern Europe has reached Cuba despite the embargo.

Prof. Estrada's institute recently received devices from Scandinavia to conduct special X-ray tests of arteries and the brain. This equipment, standard in diagnostic centers in the United



Tommy Mooncai, MGH pharmacist, pours 120 milliliters of lincomycin to fill patient's prescription for an antibiotic solution.

Metric Temperatures Require Some Study

(Concluded from Page 8)

system early in their careers. A diabetic diet, for example, must specify so many grams of carbohydrate, protein, and fat."

Dr. Robinson doubted that there would be any serious doctor-patient communications gap if the metric system replaces the English method entirely.

"A patient would still take so many teaspoonfuls of a liquid or so many tablets per day according to instructions," he said.

"Patients should be aware of the strength or size of tablets of medication in order to minimize chances of error in dosage, but most patients already have become familiar with their medications in metric terms, such as digoxin [a heart drug], 0.25 milligram."

One pitfall of the metric system, in Dr. Robinson's view, might lie in adjusting to a different temperature classification.

Under the Fahrenheit scale, water freezes at 32° above 0° and boils at 212° above. Normal body temperature is 98.6°.

The metric system uses the Celsius, or centigrade, scale whereby the freezing point of water is represented by 0° and the boiling point by 100°. Normal body temperature is 37°.

"Most patients know that a temperature of 104° Fahrenheit is pretty serious," Dr. Robinson said. "Using the centigrade scale, however, even if a layman realized that 37° is normal, he wouldn't know immediately how abnormal a reading such as 39° might be and when the time had arrived to get medical help. This would take a certain amount of learning."

MGH medical records generally list in traditional terms the height, weight, and temperature of patients. Exceptions include Ward 4, the hospital's famed metabolic research ward, and some of the intensive-care units. They record height in centimeters and weight in kilograms but retain the Fahrenheit temperature scale. In the operating rooms, however, anesthetists rely on centigrade temperature readings.

The MGH Medical Engineering Department equipped itself some time ago to service and repair metrically designed instruments. A significant percentage of the highly sophisticated devices used in the hospital were manufactured abroad.

"The English system of measurements is becoming obsolete," said Dr. Jozef K. Cywinski, Director of Medical Engineering. "Its value in contemporary measurements is diminishing.

"Also, training in the metric system is so simple. As long as one knows how to multiply and divide by 10, he can learn the method.

"One beauty of the metric system is that it offers a much more uniform method of sizing. There are few fractions in the sizes of metric tools."

Dr. Cywinski said the cost of stocking his department with metric tools, nuts, and bolts totaled only $500, a tiny expense in the department's supply budget. And it was a one-time expenditure.

If metrication became the general rule in America, departments at the MGH such as Purchasing, Maintenance, and Planning would have to acclimate. But their problems would not be very different from those of industry.

The trend toward metric is evident all around us but probably goes unnoticed because we don't think much about it.

On the labels of countless American food products you can find metric weight printed alongside English weight. The wrapper around a package of margarine might read: Net Wt. 16 Oz. (1 Lb.) 454 Grams.

Thinking about buying a pair of skis? You will find the sizes determined in centimeters. A can of motor oil might bear a label reading: 1 Qt. (.946 Liter).

Several American automobiles are now engineered almost entirely to metric specifications. To meet demands of the car makers, hundreds of suppliers have been obliged to go metric. Even major league baseball fields often list fence distances in meters as well as feet.

To a large degree, however, dual listings or actual dimensional changeovers in production can be attributed directly to the multinational operations of many U.S. firms. To catch and retain a share of lucrative overseas markets, these companies must cater to their customers abroad who "think metric."

Come what may, there is some consolation in this thought: Recipes will still call for a pinch or a dash of this or that. A sip will still be a sip. And at the racetrack, a horse may still win by a nose.

States, will improve the ability of the doctors to diagnose many types of diseases.

"Government health officials in Cuba preoccupy themselves with getting primary care to out-of-the-way places," Dr. Holmes concluded. "They're very proud of what they've accomplished. They have done it by having a tightly controlled communist style of government. I have my arguments with the way in which they've achieved it; nevertheless, I have to respect the fact that they've accomplished a lot."

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America Inches Toward the Metric System

"For a man 180 centimeters tall, you should weigh 15 kilograms less than you do," the doctor told his patient. "Get out and exercise more. Walk at least three kilometers a day."

To most Americans, the language seems strange. To more than 90 percent of the world's population, however, it is perfectly clear.

Using metric terms, the doctor had advised his patient, who is about 5 feet 11 inches tall, to lose 33 pounds and, for exercise, to walk nearly two miles daily.

If you have ever asked what the world is coming to, the metric system of expressing units of measurement such as length, mass, and temperature is one answer.

The United States is the last major nation to cling to the English, or so-called "customary," system of weights and measures which uses such familiar terms as inches, feet, yards, pints, quarts, and gallons. Even the English began a changeover to metric in 1965.

Simplicity of the metric system accounts for the shift. Unlike the complicated English measurements, all metric units are divisible by 10.

Using the decimal method of calculating, multiply a millimeter (.03937 inch) by 10 and you have a centimeter (.3937 inch). One hundred centimeters equal one meter (39.37 inches), and 1,000 meters add up to a kilometer (.62 mile).

Similarly, in dealing with weight, a gram equals .035 ounce. A kilogram is 1,000 times a gram, or about 2.20 pounds. In measuring liquid capacity, the principal unit is the liter, slightly larger than the quart.

America's present system of measuring originated in Roman days. It increased in complexity periodically as various rulers put forth their own ideas.

An Anglo-Saxon king set the foot at "36 barleycorns, taken from the middle of the ear" (of corn). King Henry I established the yard as the distance from the tip of his nose to the end of his thumb. Using the Tudor measure of one furlong equaling 220 yards, Queen Elizabeth I changed the Roman mile of 5,000 feet to 5,280 feet so that it would equal exactly eight furlongs.

By the late 18th century the English system predominated around the world. However, there was one major exception. The British weighed people in units called "stones" instead of pounds, the more customary designation.

Then in 1790 the French Academy of Science was ordered to deduce an invariable standard for all weights and measures, and the metric system evolved. Its use was made compulsory in France in 1840.

The popularity of the new method of calculating mushroomed throughout the globe. Congress authorized use of the metric system in the United States in 1866.

While Americans received no mandate to switch to metric, a proclivity toward voluntary conversion has developed over the years.

Science has led the way with the metric system becoming the universal language of the researcher. No laboratory journal will accept a technical paper for publication unless measurements are expressed metrically.

"It's surprising how much the metric system has taken over in hospitals," said Dr. Dwight R. Robinson, MGH physician and Associate Professor of Medicine at Harvard Medical School.

"Almost all medications are considered in metric terms. Essentially, we prescribe dosages in grams or milligrams.

"In nursing, needles are still measured in inches, but syringes and intravenous bottles carry metric values. Volumes of injectable liquids are almost always calculated in cubic centimeters.

"MGH dietitians learn the metric

(Concluded on Page 7)

Using a special balance scale, Miss Jane Gillis, RD, dietitian in the metabolic research unit, Ward 4, obtains exactly 80 grams of carrots for a patient's diet.

MGH News

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Space Travel May Provide Clues to Hypertension

Ensuring Highest Standard of Nursing Care

A few years ago, Miss Rita Colley, RN, primarily ministered to seriously ill patients who could not eat in the normal manner.

As a member of the MGH Hyperalimentation Unit, which specializes in the delivery of nutriments intravenously, she visited bedsides daily, checking the dressings of patients and evaluating their overall condition.

Her experience coupled with further academic training led to the development of exceptional skills as a hyperalimentation nurse specialist.

Today in the face of an ever mounting need for highly sophisticated nursing care, Miss Colley finds her status changing.

She is one of a score of nurses at the MGH whose qualifications in various medical specialties have cast them into roles as teachers. Referred to as nurse clinicians, they apply their expertise in all areas of the hospital.

The concept of the nurse clinician arose in the 1960s as a way of getting some of the best educated and trained nurses more involved in patient care.

In that decade studies such as one carried out by Patricia A. Regan, a doctor of education, now of the MGH, indicated that the nurses with advanced education ended up farthest from the bedside. Often they spent most of their time performing administrative duties or teaching in colleges.

As the program has evolved, the nurse clinician does care for patients directly. But increasingly at some hospitals such as the MGH, she also teaches and guides other nurses *at the bedside*. As a result this new type of nurse can through those she has taught ultimately help many more patients than she could possibly care for herself.

Miss Colley and Nurse Clinician Jeanne Wilson, RN, may call on as many as 55 hyperalimented patients during the course of a day. They stressed the fact that they regard care of the patients and the educating of other nurses on how to look after them as equal responsibilities.

"One of the dangers of hyperalimentation is a yeast infection around the mouth," Miss Colley remarked. "With proper training, a nurse can recognize this infection at once and institute effective mouth care as the matter is being

(Continued on Page 2)

As the surgeon operates, an artist captures important details. See story on page 5.

An MGH team is engaged in long-term space studies aimed at gaining a better understanding of a disorder which affects an estimated 24 million Americans.

With the cooperation of the nation's astronauts, the researchers, led by Dr. Edgar Haber, Chief of the MGH Cardiac Unit, hope to learn how the body's normal control of blood pressure may be influenced by extreme conditions.

High blood pressure, or hypertension, is one of the most common cardiovascular diseases and a leading cause of disability and death.

"It is often extremely useful to study normal human function," Dr. Haber said, "so that one can have some insight into how that physiology is disturbed in a disease process.

"Sometimes in order to understand something normal you have to create an extreme, to really stress the system maximally. When you've accomplished that, you may then see how it regulates itself under more normal conditions."

MGH research on the effects of space flight on blood pressure began as a follow-up to investigations conducted at the hospital in the late 1960s.

In these earlier studies volunteers were placed on a tilt table and allowed to rest for 20 to 30 minutes until their pulse rate and blood pressure stabilized. Then each volunteer was tilted to an 80° angle. Most of the group adapted very well to the postural change while the remainder became faint, or light-headed.

The experiments showed that in those persons who responded normally to the tilt-table stimulus, levels of a kidney substance called renin began

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MGH *News*

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EDITORIAL:

Curing the Ills of Promotion

One of life's paradoxes: The more education, the higher a person tends to advance in his career. The higher one rises, the less likely the person is to carry out whatever duties attracted him to his profession in the first place. What appears to be a "promotion" may in reality prove to be a mixed blessing or even a mistake. Some examples: The salesman who becomes sales manager no longer sells. The teacher who becomes principal no longer teaches. The trial lawyer who becomes a judge never again tries a case. Or the nurse who becomes a supervisor does not take care of patients.

Nursing has solved the problem for some nurses at least. A page 1 article describes the nurse clinician. In a sense she was "invented" to get some of the better educated nurses back to the bedside. Like schoolteachers, nurses – especially the most educated – have been increasingly burdened by administrative duties. Hence the creation of a highly educated type of nurse who can bring an unusually sophisticated level of care to the patient. In addition, she can reach out her helping hand to many more patients by guiding and teaching those with less education or training in the nurse clinician's special area of expertise. Since most of this teaching is carried out at the patient's side, the new type of nurse preserves the sort of relationship which attracted her to nursing. Her advancement through education and experience can also serve as a model to other nurses. The result of the nurse-clinician program is a happy one for the patient, the nurse, and the nursing profession.

* * *

The terms nurse clinician and nurse practitioner are used differently and sometimes interchangeably around the country.

At the MGH the nurse practitioner (*MGH News,* May 1969) generally has undergone several months of intensive training to learn to perform some of the routine functions normally carried out by a physician. She then works closely with one or more physicians, freeing them to devote more time to patients with more complicated problems. Nurse practitioners at the MGH tend to work in the Ambulatory Care Division and at the MGH-operated neighborhood health centers.

On the other hand most nurse clinicians have graduate degrees. Instead of performing some of the routine duties of physicians, they are qualified educationally and experientially to assume a leadership position. The distinction between the two titles can be confusing. However, both groups, like nurses in general, perform a highly important function in providing a blending of skill and "tender, loving care."

Nurse Clinicians Hold Patient-Care Classes

(Continued from Page 1)

brought to the attention of the physician."

Between them, Misses Colley and Wilson receive up to 40 calls a day from nurses seeking advice. Some inquiries made to the Hyperalimentation Unit, headed by Dr. Josef E. Fischer, require immediate action.

"After tending to the priority needs of the patient, we have a responsibility to pursue the problem," Miss Wilson said. "We provide whatever additional information is needed to make the nurse who called capable of solving any such future problem herself."

To ensure the best possible care for the hyperalimented patient, the two clinicians conduct orientation classes for all new nurses joining the MGH staff. Daylong workshops are also scheduled, and informational bulletins are published.

Miss Colley is a graduate of the MGH School of Nursing and the University of Massachusetts. At a recent international nutrition congress in The Netherlands, she lectured on the team care provided by MGH nurses, physicians, and pharmacists for the hyperalimented patient.

From time to time, a nurse clinician faces a challenge the resolution of which engenders a deep sense of personal satisfaction.

An 86-year-old man entered the MGH for treatment of a leg ulcer and simultaneously received unexpected care for another problem, ending 20 years of inconvenience, discomfort, and embarrassment.

Soon after the patient's arrival, his physician summoned Nurse Clinician Carolyn Tamer, RN.

The doctor explained that the ulcer was precipitated by excessive fluid in the patient's leg. This accumulation (edema) probably stemmed from the elderly man's unorthodox manner of coping with an abdominal opening (stoma), created for the discharge of body waste.

Following surgery for cancer of the rectum 20 years earlier, the patient

Photographs: Pages 3, 5, 7, 8, Joel Salhanick; p. 4, Robert Crivello. *Drawings:* Page 1, Robert Ullrich; p. 6, Edward Waldo Emerson; p. 7, MGH Archives.

Miss Janet D'Agostino, RN, adjusts a young patient's hyperalimentation dressing while Nurse Clinician Rita Colley, RN, observes.

had undergone a procedure called a colostomy. He could not adjust, however, to the customary pouch for collecting his waste. He discarded the bag and improvised his own system.

"It consisted of wearing 20 layers of paper towels over his abdomen," said Miss Tamer. "He also wore a snug leather belt around his pelvis as part of his colostomy garb. This belt was suspected of causing the edema.

"The doctor asked me to fit his patient with a colostomy bag. Initially, the man was quite irascible, insisting that he didn't want or need my help, but over a three-day period I convinced him that there was no reason to remain uncomfortable.

"Grudgingly, he followed my instructions and very soon realized how easy his care could be. When he left the hospital later, he was a much happier man."

A graduate of the Lawrence Memorial Hospital School of Nursing in Medford, Mass., Miss Tamer served nine years at the MGH as a staff nurse, unit teacher, and head nurse before being appointed as a nurse clinician four years ago.

In conjunction with Nurse Clinician Jean M. Donovan, RN, Miss Tamer treats ostomy patients and teaches the newest techniques to other nurses. The two clinicians visit an average of 30 patients daily in various parts of the hospital and provide supportive and rehabilitative postdischarge care in the MGH Stoma Service. Nevertheless, they place ever increasing emphasis on the instructional phase of their responsibilities.

"Keeping knowledge to one's self only results in patients developing a total dependency upon you," Miss Tamer pointed out.

"I encourage nurses to accompany me on bedside visits to learn firsthand how particular complications should be handled.

"The patients, meantime, become more relaxed, knowing they now can rely on their unit nurses for specialized assistance if needed."

Treating ostomy patients often includes skin care around the abdominal opening. Identical care can benefit other types of patients as well.

Miss Tamer frequently conducts formal classes and workshops for the nursing staffs. Last May at a seminar sponsored by the Ostomy Association of Boston, she addressed hundreds of nurses from many areas of the country on the preoperative and postoperative care of ostomy patients.

Still another important field of patient care is psychiatric nursing. One of seven psychiatric nurse clinicians at the MGH, Mrs. Christa Brown earned two degrees at Boston University. She taught her specialty there and at Boston College for more than seven years before joining the hospital staff.

Mrs. Brown and her husband, Elliot, of the MGH Social Service staff, conduct group discussions with relatives of cardiac surgical patients.

"We started these informal sessions," Mrs. Brown said, "because we felt that the relatives had only limited access to the kinds of information and emotional support that could lessen their ordeal.

"They come to our meetings on Warren-Baker 12 [the cardiac surgical floor] seeking answers to many questions. 'We have stairs in our house,' a wife might say. 'Will I have to set up a room downstairs for my husband when he comes home?' Or, 'Will he have to go on a special diet? Will he be able to go back to his job?' "

"We explain what is generally the course for postoperative heart patients," Elliot Brown stated. "While we can't place ourselves in the role of the doctor, we can correct misconceptions and erase, or at least ease, unfounded fears."

In lessening anxieties the Browns also clear the way for relatives to "hear" what the doctor says about the

(Concluded on Page 4)

Nurse Clinician Jean M. Donovan, RN, checks on patient after urinary diversion surgery to make sure he has no postoperative problems.

Kidney Agent Can Stimulate Rise in Blood Pressure

(Continued from Page 1)

to rise after 5 minutes upright, peaked at 20 minutes, and then stabilized. Renin activity returned to normal after downward tilting. Those subjects who became faint had a different renin response.

Renin is a kidney enzyme (a protein which promotes a chemical reaction). After secretion from the kidneys, renin circulates in the blood to release another chemical substance, a hormone (body messenger) called angiotensin. The latter has the ability to constrict the muscular walls of arteries, thereby raising blood pressure.

Angiotensin also has an effect on the adrenal gland's secretion of a hormone called aldosterone, which helps to regulate the salt and water balance in the body.

The dizziness experienced by a few of the volunteers is analogous to what may happen when a person bolts from bed after prolonged rest. The jump to a standing position can be faster than the body's ability to increase blood circulation.

The early MGH investigations were conducted by Drs. Suzanne Oparil, Carlos Vassaux, Charles A. Sanders, now MGH General Director, and Haber.

When NASA investigators at the Manned Spacecraft Center in Houston, Tex., learned of the MGH study, they became extremely interested.

"They were having several problems

Drug (to block renin-angiotensin system) is administered to volunteer (top photo) by Dr. Maite Escourrou of Paris, MGH Fellow in Cardiology, while Dr. Richard N. Re, MGH endocrinologist working with the Cardiac Unit, monitors blood pressure. At right, Dr. Re observes how the volunteer's blood pressure tolerated tilting maneuver.

with astronauts in the Gemini series," said Dr. Haber. "After the men returned from long periods of weightlessness in space and stepped onto the deck of the recovery carrier, they tended to be woozy and faint. Nobody knew why. There was a general feeling that their cardiovascular system was in some way deconditioned."

Tests taken immediately after subsequent Apollo flights showed that renin levels in all of the crewmen were enormously high – 10 to 25 times the usual amount. Just one day after the astronauts returned to the earth's gravity, however, their renin dropped to normal.

What caused the tremendous increases? Were they related to prolonged weightlessness, or perhaps the high gravitational pull upon reentry? Since inflight blood samples could not be taken in the Apollo series, the answers were not then available.

As space flights became longer and longer, another problem occurred, a tremendous loss of body potassium, an element essential to the proper function of various organs.

With the inauguration of the Skylab program and assignment of a physician-astronaut to each crew, the first real headway was made in sorting out the biomedical problems.

For the first time blood samples were obtained during flight in zero gravity. Utilizing MGH methods, sci-

Nurse Clinicians

(Concluded from Page 3)

patient. Without this orientation the relatives might otherwise approach the doctor in such a distraught state that his words to them would only become distorted.

The Browns estimated they have talked with the families of at least 1,500 heart patients since the inception of their group meetings four years ago.

Mrs. Brown does not confine her psychiatric expertise to the cardiac floor. "I work frequently with patients who are management problems," she said.

"A patient, for instance, may become very depressed on learning the severity of her illness and cry for a long while. The nurses may not know what to do. I would show them how to help the patient talk about her condition and how to encourage her to eat and to rest."

Mrs. Brown schedules weekly meetings with nurses on the floors that she covers. "We discuss not only plans for patients but also the nurses' feelings about patients," she said. "Sometimes the nurses need an opportunity to ventilate, to get a perspective on what they've been going through with a troubled patient so that they can continue care of that individual."

Artists Record Newest Medical Techniques

A surgical team is, of necessity, a closely knit group. While the surgeon and his assistant operate, a scrub nurse hands them additional instruments and other materials. A circulating nurse stands by to go for anything needed unexpectedly. The anesthetist, who rendered the patient unconscious, carefully monitors vital signs.

Sometimes, a sixth person wearing surgical gown, cap, and mask is present. Not a member of the operating team, he draws no attention. He simply draws.

Peering around or over shoulders and into a deep wound or lesion, the artist sketches an outline of what later will become a graphic representation of an unusual physical disorder or new operative technique.

In a major teaching hospital such as the MGH, the medical illustrator is indispensable in the medical educational process. Using special skills, the artist makes available to present and future doctors permanent records of the latest contributions to their profession.

The work must be so expert that it will stand up to all kinds of reproduction – in textbooks, journals, newspapers, slides, and exhibits.

The illustrator works closely with the photographer in recording laboratory specimens and patient care for teaching and research. To capture a fleeting instant of action or demonstrate specific subject matter in clear view, the camera enjoys definite advantages. But the illustrator can proceed further.

"The camera can only record what it sees," said Mrs. Edith Tagrin, Director of the MGH Medical Art Department. "The artist, by virtue of training and background, can put on paper what exists but may not be visible. We can strip away such extraneous things as hands, blood, or instruments which hide the principal subject."

Mrs. Edith Tagrin
Director, MGH Medical Art Department

Through technical means, the artist might also show inner structures through the outer surface as if the latter were transparent. Or, by use of light and shadow, he might focus a reader's eye on significant parts of an illustration while de-emphasizing less important areas that are needed only for orientation.

"The value of the camera should not be underestimated," Mrs. Tagrin emphasized. "Many illustrators will snap away with their own cameras in an operating room and then use the photographs as references in doing comprehensive educational drawings.

"Many of our doctors take their own pictures, then show them to us and say, 'I'd like you to illustrate this.' "

Medical art dates back thousands of years. Leonardo da Vinci might have been acclaimed as the "Father of Anatomy" if his brilliant anatomical sketches had not gone undiscovered for many years. The title fell, instead, to a young Italian physician, Andreas Vesalius.

In the mid 16th century, some 25 years after the death of da Vinci, Vesalius took advantage of a civic position in Italy to perform autopsies. He interested an artist, Jan Stephan van Calcar, in drawing what was dissected. From this came *De Humani*

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entists at the Manned Spacecraft Center later carried out extensive experiments on the hormonal control of the space travelers' cardiovascular systems.

Dr. Haber, Professor of Medicine at Harvard Medical School, said striking changes were found, but he emphasized that at this time he "would be very hesitant to put all of the results together and say, 'This is our conclusion.' "

Although medical astronauts have gone into space, he said, they had a great many nonmedical duties to perform so that it was not really possible for them to get the optimal kind of data.

During planned flights of the space shuttle, which will be rocketed aloft but land much like an airplane, scientists without air training will be able to go into orbit. They will thus be free to devote their entire effort to unraveling in great detail the medical mysteries.

In preparation for this research, Dr. Haber and Dr. Richard N. Re, an MGH endocrinologist working with the Cardiac Unit, hope to oversee a series of preliminary, as yet unfunded, studies involving at least a dozen volunteers. They would rest in bed for up to several weeks and then be tested in a number of ways.

Since tilting in space means nothing because there is no gravity, a substitute has been devised called "lower body negative pressure."

The lower part of the body is encased in an airtight box, and pressure within the box is reduced, causing pooling of the blood in parts of the body enclosed. Investigators can then assess the reaction of the renin-angiotensin system as if the volunteer were in a weightless environment. Similar tests were conducted on astronauts during the Skylab program.

In another test, drugs can be used to interrupt, or block, the renin-angiotensin process so that researchers can record what follows.

Gaining insights into how bodily functions are disturbed in hypertension is particularly important because high blood pressure presents no initial outward symptoms.

Only half of those people with the condition are aware of it. And only a small percentage of those who *do* know seek treatment until after they have already developed arteriosclerosis, a heart attack, a stroke, or some other life-threatening damage.

The studies directed by Dr. Haber are aimed at understanding essential hypertension, that form of the disease which is of unknown cause and affects most high blood pressure sufferers.

"There is a group of essential hypertensives who have abnormally high renins, and another group with abnormally low renins," Dr. Haber said. "People are working very hard to know why these renin abnormalities exist, but even the fact that they do exist gives the doctor who is treating those patients a considerable clue as to what medicines are most effective."

MGH Pioneered Concept of Hospital Artist

(Continued from Page 5)

Corporis Fabrica Libri Septum, a work that revolutionized the study and teaching of anatomy.

Medical illustrating at the MGH predates the Civil War. On March 21, 1857, the MGH Medical Board sent the hospital's trustees a letter which read:

"There are constantly offering at the Hospital both Medical and Surgical cases of great importance which no description can convey an idea of and which can only be preserved by a delineation of their physical characters.

"To perpetuate these cases it seems very desirable that an Artist should be attached to the Hospital to make drawings and thus to collect a valuable mass of information . . ."

The following month the trustees acceded to the request and created the post of "Artist of the Hospital." To fill the position, believed to be the first of its kind in any American hospital, the trustees chose Dr. Lucius Manlius Sargent, just out of Harvard Medical School and a kin of the distinguished artist, John Singer Sargent.

Under a mandate to "make accurate drawings of such anomalous and rare cases of disease as shall be useful for future reference and examination," Dr. Sargent drew numerous illustrations, some of which are still exhibited. But his career was short-lived. He died near Bluefield, Va., in 1864 after being wounded in a Civil War cavalry battle.

For eight years after his death, artists served informally at the MGH. In 1870, a drawing by Edward Waldo Emerson, a first-year Harvard Medical School student and son of Ralph Waldo Emerson, was included in the first recorded case history of muscular dystrophy at the hospital.

From 1872 to 1892, the "Artist of the Hospital" was Dr. Henry P. Quincy, who also taught histology (structure of tissues) at Harvard. The "Artist" title lapsed when Dr. Quincy died. Once again, illustrators were hired on a special-assignment basis by individual surgeons, anatomists, and pathologists.

The course of medical art at the MGH began to change again in 1930 with the arrival of Miss Muriel McLatchie, fresh out of the Johns Hopkins Medical School Department of Art as Applied to Medicine. Dr. Joe V. Meigs, destined to become Chief of Staff of the Vincent Memorial Hospital and Chief of Gynecology at the MGH, had written a book on gynecological tumors, and he hired Miss McLatchie to illustrate it.

With office space at a premium, Miss McLatchie had to settle for a desk and chair in a fourth floor hallway of the Bulfinch Building.

This sketch of the first recorded muscular dystrophy patient at the MGH was drawn in 1870 by Edward Waldo Emerson, first-year Harvard Medical School student and son of poet and essayist Ralph Waldo Emerson.

"The lighting is better out here anyway," she once said of her working area, located midway between a fire escape and an elevator.

Ward screens borrowed to ensure some measure of privacy only whetted the curiosity of hospital personnel. "I was peeped at," she said, "by all who passed by, somewhat in the manner of the traditional 'bird in a gilded cage.' "

Miss McLatchie's work for Dr. Meigs so impressed medical personnel, however, that her assignment quickly led to others. In 1932, she was retained as a full-time medical artist at the MGH, a position she held for the next 28 years.

During her long tenure, Miss McLatchie, who later became Mrs. Floyd Miller, founded a School of Medical Illustration at the hospital. She stressed to prospective students the need for a thorough understanding of anatomy and histology as well as art.

"Because an individual is a top landscape or mural painter does not mean that he will be a good medical illustrator," she said. "In all likelihood, he will not be able to understand the fine detail needed in this work.

"For example, the lung, a difficult tissue to portray owing to its light, airy composition despite a solid mass appearance, cannot possibly be drawn by anyone unfamiliar with its structure. This thorough knowledge of tissue can be acquired only through dissection and the careful study of histology."

The school operated on a tight budget. A skeleton was needed for an anatomy course, but the school could not afford one. It was not unusual to see a student lugging a borrowed skeleton through the hospital corridors. Mrs. Miller finally managed to acquire a small arthritic skeleton which her students promptly christened "Peaches."

When Mrs. Miller retired in 1960, her position at the hospital was assumed by another Johns Hopkins graduate, Thomas A. Stebbins. Mrs. Tagrin, a graduate of the MGH School of Medical Illustration, assumed production responsibilities of the service department while Mr. Stebbins served as administrator for the school and medical art department.

Only a few years later, more changes took place. Mr. Stebbins transferred to the University of Washington Medical School. Mrs. Tagrin was promoted to MGH Medical Art Director, and the School of Medical Illustration at the MGH was phased out.

"The Association of Medical Illustrators conducted a very comprehensive survey," Mrs. Tagrin said, "and decided that schools of medical illustration belonged in a medical school rather than a hospital environment."

Mrs. Tagrin feels the decision was a wise one. "You can now become a medical illustrator in five or six years, leaving school with a master's degree," she explained. "In earlier days, most

Dr. Meader Organized Patient-Rights Panel

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ago was promoted to N.I.H. Deputy Director, the second-highest position in the organization.

During the first six months of last year, he served as Acting Director of the agency.

A quirk of fate had caused Dr. Lamont-Havers to pursue arthritis and rheumatism as a medical specialty.

"I had every intention of becoming a cardiologist or a gastroenterologist after earning my medical degree at the University of Toronto," he said, "but when I began my residency at the Queen Mary Veterans Hospital in Montreal I found myself assigned to a ward where half of the 50 patients present were arthritics. So I was forced to study arthritis, and I became fascinated with the subject."

A fellowship from the Canadian Arthritis and Rheumatism Society followed. Dr. Lamont-Havers opted to train at the MGH, but no openings existed here.

Instead, he studied at Columbia Presbyterian Hospital in New York City, then returned to Vancouver, B.C., his hometown. The opening at the Arthritis Foundation in New York developed two years later.

Dr. Lamont-Havers was born in a small town in England but emigrated with his family to Canada at the age of 7. He graduated from the University of British Columbia before undertaking his medical studies in Toronto.

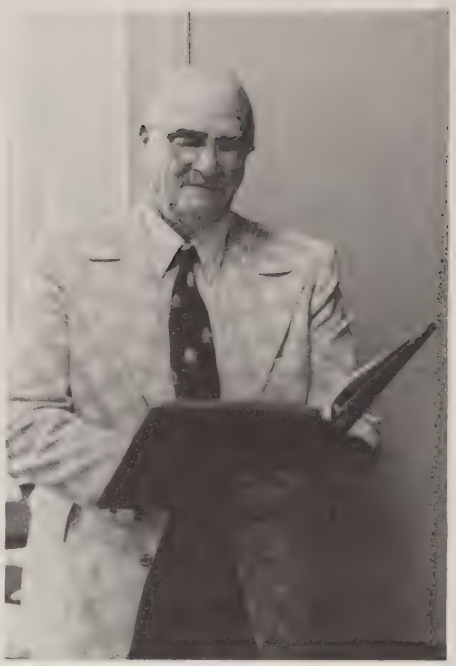
He now lives in Sudbury, Mass., with his wife, the former Hale Gabrielson, and two youngest children, Ian, 5, and Melinda, 6. Mrs. Lamont-Havers is named after a famous relative, the American patriot Nathan Hale.

In making way for his successor, Dr. Meader reflected on what has impressed him most about the MGH since he came here 11 years ago from the N.I.H.'s National Cancer Institute (N.C.I.).

"During the 18 years that I was at the N.C.I. in charge of grants for research and training, I came to know many institutions across the country," he said. "I never sensed in them quite the degree of communication, trust, and respect among staff members, or concern for the patient, that I have seen here."

Among Dr. Meader's first official assignments at the MGH was organizing a Subcommittee on Human Studies to guard the rights of patients and other volunteers involved in such research.

One of the earliest panels of its kind, the subcommittee was headed by Dr. Henry Knowles Beecher, then



Ralph G. Meader, Ph.D.

MGH Chief of Anesthesia, who died in July (*MGH News,* October 1976). Dr. Meader was the subcommittee's first executive secretary.

As the burdens of his office increased, he turned over his position with the human studies group to Dr. Edgar B. Taft, an MGH pathologist. Dr. Taft continues in this role and also is closely associated with Dr. Lamont-Havers in other matters affecting the Research Office and the Committee on Research.

In 1965 the principal areas of research at the hospital involved cancer, cardiovascular diseases, arthritis, and metabolic disorders. Despite advances that have been made, the priority list remains essentially unchanged.

Dr. Meader taught for many years before entering the research management field. After obtaining an A.B. (magna cum laude) from Ohio Wesleyan University, he instructed in biology for three years at Hamilton College and also earned a master's degree there.

A brief period as a biology teacher followed at Wesleyan University. Then Dr. Meader spent 17 years teaching anatomy at Yale University, where he also obtained his doctorate.

He holds honorary degrees from Ohio Wesleyan and the Philadelphia College of Osteopathy.

At the climax of his long career, Dr. Meader welcomes his expanded leisure time as an opportunity to join his wife in paying more frequent visits to their 100-acre farm at Sanbornton, N.H.

students enrolling at the MGH school for three years of training already had spent four years in college."

This summer an exhibit entitled "Art and Medicine" was presented at the Boston Museum of Science. The exhibition was sponsored by the National Endowment for the Arts. By invitation, Mrs. Tagrin contributed to the show original examples of her work.

Today the MGH Medical Art Department occupies its own modern quarters at 100 Charles River Plaza, a few blocks from the MGH complex. The cabinets, lighting, and floor space were specially designed to meet the department's requirements.

In addition to Mrs. Tagrin, members of the staff include another medical illustrator, two technical artists, and a secretary.

"Because we are small," said Mrs. Tagrin, who has illustrated 19 books, "vacations are often postponed, and when we plan a day off, we usually have to settle for just leaving an hour early that day.

"But the work that passes over our drawing tables is truly interesting and challenging. Despite the problems, I would not change my vocation for any other."

Surgery to remove spinal lesion

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Research Policies Face Rigid Review

An intensive nationwide reassessment of policies affecting all types of research activities will take place within the next two years, according to the new director of the MGH Research Office.

"These public discussions, sparked by Congress, will generate proposed new policies and programs to bring the fruits of research under closer and closer scrutiny as they near application," said Dr. Ronald W. Lamont-Havers.

The former Deputy Director of the National Institutes of Health (N.I.H.), who assumed his MGH post in September, said the forces that act on research in this country already have changed.

"Federal support, for example, can no longer be regarded as certain," he warned. "What used to be referred to as 'hard money' is now very 'soft.' "

Dr. Lamont-Havers expects the federal government to become more involved in health-care delivery, demanding more comprehensive explanations to justify each fresh procedure. "It is important," he warned, "that this concern with health-care procedures not be allowed to interfere with the acquisition of new knowledge."

In general, Dr. Lamont-Havers regards the future for research as good. "There has to be a limit on how much money can be channeled into research," he said, "but we haven't reached that limit yet."

Of deep concern to him, however, is a growing erosion of confidence in the stability of investigative careers among prospective young researchers.

"This confidence that a research career can be fulfilling, that it can provide the necessary compensation to support a family, must be reinstated in the minds of young people," he said.

An estimated three quarters of MGH research funds come from the federal government, and about 90 percent of the federal support is derived from the N.I.H. By creating or stepping up contacts with private industry, Dr. Lamont-Havers hopes to broaden the hospital's base of support for investigative studies.

The new director succeeded Ralph G. Meader, Ph.D., who had guided and supervised the hospital's research programs since 1965. At that time, the financing of such work at the MGH came to $7 million annually.

"The research program now totals nearly $20 million, all of which comes from various private and governmental grants, and none from the patient-care budget," said Dr. Charles A. Sanders, MGH General Director.

"To head such a massive effort requires special qualities. We were fortunate to have found them first in Dr. Meader and now in Dr. Lamont-Havers, who will fulfill an expanded role of aiding in the formulation of research policy."

Dr. Meader will continue to serve at the MGH on a part-time basis, assuming responsibilities for negotiation of contracts and grants with the awarding agencies. In this capacity, Dr. Meader will be Assistant to Associate MGH General Director Lawrence E. Martin.

As Deputy to the General Director for Research Policy and Administration, Dr. Lamont-Havers not only will oversee all aspects of MGH research policy and evaluate contracts and grants but will also carry a host of other responsibilities.

These duties will include coordinating research programs with various public and private agencies, assisting investigators in developing financial resources, and representing the hospital at major scientific meetings.

He has also inherited Dr. Meader's important previous co-duties as Executive Secretary of the MGH Committee on Research.

An eminent rheumatologist, Dr. Lamont-Havers served almost ten years as National Medical Director of the Arthritis Foundation before joining the N.I.H. in 1964.

He became Deputy Director of the National Institute of Arthritis, Metabolism, and Digestive Diseases, a branch of the N.I.H., in 1972 and two years

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Dr. Ronald W. Lamont-Havers

MGH News

Vol. 36 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS February, 1977

Helping a Patient to Combat Rare Blood Disorder

Chelsea Center Reaches Out to the Elderly

It would be easy for a busy health center to overlook Chelsea's elderly population. Often immobile, poor, and fearful of change, they remain hidden in their homes. To keep them in good health, you have to find them first.

That's exactly what the MGH-Chelsea Health Center set out to do three years ago. The aggressive delivery of primary care, called "outreach," was the key concept in a grant awarded the center for the care of the elderly by the Edna McConnell Clark Foundation.

Working with community leaders, the center trained three volunteers from VISTA (the domestic equivalent of the Peace Corps) to conduct a door-to-door canvass. The volunteers sought and screened Chelsea's elderly residents, who represent 20 percent of the city's total population. In the initial estimate, some 65 percent suffered from a major chronic disease.

"The first thing we learned was that although we were offering high-quality care within the health center, there was a whole range of obstacles blocking the elderly from obtaining that care," said Miss Eleanor Clark, the center's former Administrative Director and Director of the MGH Social Service Department.

The obvious problems centered on transportation, finances, and medical insurance. Others, less directly related, were in the areas of housing, social relationships, and nutrition. Through the grant, the center's adult-medicine team devised some unusual methods of tackling these issues and bringing the elderly into the health-care system.

Among the most effective was the creation of a position thought to be unique among neighborhood health centers in the United States. Called "case coordinator," the job designates one person whose sole responsibility is to facilitate access to medical care for the center's older patients.

Mrs. Lorraine Capistran, chosen as that key person, was honored in 1975 by the Metropolitan Boston Consumer Health Council, Inc. She received the Outstanding New Professional Award in the Field of Community Health.

(Continued on Page 2)

During MGH visit for a routine blood test, Joseph Cochrane chats in Emergency Ward with Miss Virginia (Ginny) Flatley, RN, who helped care for him during several emergency admissions.

Several evenings each week, Joseph (Joe) Cochrane settles his husky, six-foot frame behind a set of drums in a hotel, club, or social hall and joins fellow musicians in helping people put aside their cares.

Since he was 13 years of age, entertaining others has been a way of life for the 53-year-old resident of Boston's Back Bay. In recent years, however, his music has assumed an added personal significance. Performing has given him temporary respites from anxieties of his own.

Since January 25, 1971, Mr. Cochrane has been admitted to the MGH 17 times when precipitous drops in blood pressure have resulted in shock.

He suffers from a blood condition known to have affected only four other people in the world. He is the sole survivor.

"What happens is that Mr. Cochrane develops a leakage in his capillaries, the smallest of the body's blood vessels," explained Dr. Newton E. Hyslop, Jr., MGH immunologist. "The serum content of the blood in which the red and white cells hang suspended leaks out into muscle tissue.

"The resulting drop in volume within the vessels causes them to collapse, and Mr. Cochrane's blood pressure falls to undiscernible levels."

Fortunately the attacks do not arise suddenly. They begin with a growing overall weakness that leaves the patient unable to stand without becoming light-headed. Twinges and aches follow. Mr. Cochrane has reported feeling symptoms as long as two days before being rushed to the MGH.

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EDITORIALS:

Bringing the Mountain to Muhammad

The patient's social well-being has traditionally been entwined in the medical care at the MGH. Since its founding in 1811, the hospital has been pervaded by a spirit of volunteerism. Volunteers have primarily concerned themselves with the nonmedical needs of the patient. In 1841 the institution founded the Warren Library, the nation's first hospital library for patients. And in 1905 the MGH inaugurated the first department of Social Service in a hospital. This department itself in 1964 created what is believed the nation's first Transfer Office, a unit designed to find high-quality extended-care facilities for patients when they no longer need more costly hospital beds. The Office of Patient Care Representatives (*MGH News*, September 1976) looks after the nonmedical as well as medical interests of the sick.

Then there are the MGH health centers, one in Charlestown and one in Chelsea and the independent North End Health Clinic, with which the MGH enjoys a close working relationship. These centers are testimonials to the realization that people often feel more comfortable obtaining their primary health care in their own backyards. Not only sociologic but also economic benefits accrue because the patient saves the time and money of transportation.

In this issue a front-page article describes one of the latest in the social advances at the MGH. The MGH-Chelsea Health Center has recognized that setting up a building in no way guarantees that residents needing medical care will take advantage of the opportunity. As a result an outreach program has helped bridge the chasm for elderly patients – the group most requiring help. The center also created the position of "coordinator" to make certain that those 60 years or older have access to the facility as well as to many services which help them solve the problems of daily living. When the invalid patient is unable to go there, the center in the person of the doctor and the coordinator goes to the patient. As a consequence a warm relationship has developed between patient and coordinator, and the patient knows that the center extends a helping hand.

Bigelows Three

The name "Warren" has long been associated with the MGH. In 1811, a Warren cofounded the hospital, and his descendants served the institution until well into the 20th century.

Next to the supernovas of the Warren family, even a bright cluster of stars might appear pale. But the Bigelows have themselves burned brilliantly in the MGH firmament. A page 8 article recounts *their* story. And like the Warrens, they now have a segment of the MGH complex named after them.

That Special Care Helps Keep Elderly Out of Hospitals

(Continued from Page 1)

Mrs. Capistran's contact with the elderly patients begins with their first telephone call to the center. Making an initial assessment, she screens those needing immediate treatment and schedules appointments.

Every new patient aged 60 or over is registered by Mrs. Capistran. She familiarizes herself with the important factors in the patient's environment: his "support system" of friends and relatives (if any), his diet, housing, means of transportation, financial resources, and enrollment in Medicare or Medicaid.

After the physician's examination, she may aid in getting prescriptions filled. She follows up on every patient who misses an appointment and telephones the forgetful ones ahead of time. She is also the patient's liaison with other helping agencies.

"Probably my most important job is to be the one person here who is available any time of the day for any question, however trivial it seems," Mrs. Capistran said.

A secretary for five years in Miss Clark's office at the MGH, Mrs. Capistran is a native of Chelsea, where her husband is Deputy Fire Chief. She was trained by the grant's project coordinator, Mrs. Kathleen Hourigan Lique; by a social worker, Miss Susan Shulman; and by a nurse practitioner, Mrs. Laurie O'Leary, all members of the center's adult-medicine team.

"Lorraine was a natural choice," Miss Clark said. "She's a warm, responsive, attractive person who *truly* cares, and she communicates that."

A major goal of the Chelsea center's program is to prevent expensive hospitalization by helping older patients care for themselves in their homes. To support that effort, Mrs. Capistran has explored and tapped the city's resources.

A call to the Fire Department, for example, will promptly produce two firefighters to carry a disabled patient

Photographs: Pages 1, 4, 5, Joel Salhanick; p. 3, Mary M. Hoffmann; pp. 6, 7, Robert Crivello; p. 8, MGH Archives.

to a car waiting to transport him to the health center.

She often makes referrals to the Visiting Nurse Association, which provides home nursing care; the Home Care Corporation's homemaker and heavy-chore services; "Meals on Wheels," which delivers a low-cost hot meal daily; and a local recreation and social center.

In some cases the staff leaves the MGH-Chelsea Health Center to treat older patients in their homes. Once a week Mrs. Capistran accompanies a physician to the Buckley Apartments, a 200-unit housing facility for the elderly. In addition, about 48 patients who cannot leave their homes are regularly visited by a physician.

In receiving the grant, the center also made a commitment to educate all those who care for the elderly. Inviting staff from other agencies, the Chelsea team conducted a popular series of in-service seminars on such topics as death and dying, helping victims of aphasia (impairment of language ability often caused by stroke), and the nutritional needs of the elderly.

Dr. Terrence A. O'Malley, an MGH physician specializing in primary care, believes the doctors as much as any team member should be concerned with environmental factors that affect a patient's health.

"By serving as a mirror to our practice, Lorraine allows us to better share in the total care of the patient," he said.

An 85-year-old woman, one of the Chelsea Center's first patients, is greeted by Mrs. Lorraine Capistran, Case Coordinator for the elderly.

"The patient will tell her a problem, sometimes crucial to his care, that he is for some reason reluctant to discuss with the physician," Dr. O'Malley said. "He may also reveal to her his reaction to the care he received or his perception of his illness."

Opening in 1971 as a well-baby clinic (*MGH News,* October 1974), the MGH-Chelsea Health Center gradually expanded its service to all ages. Its administration is shared by Dr. Andrew D. Guthrie, Jr., Medical Director, and David Catalano, Administrator.

The clinic was formed originally in response to a health-care crisis resulting from a critical shortage of physicians in the economically depressed city. As family physicians retired or died, many residents, the center found, had simply given up seeking care.

One 69-year-old resident, Mrs. Brown (not her real name), had for years made the three-mile trip to the MGH before being treated at Chelsea. Suffering from several chronic problems, she seemed to have difficulty caring properly for herself.

"We found that when she became depressed and lonely, she would not eat well or take her medications correctly," Mrs. Capistran said.

In the initial interview, Mrs. Capistran learned that the patient, surviving on Social Security alone, lived in a damp basement apartment infested with rats. She was on shaky terms with the only accessible relative, her daughter. In the last eight years, Mrs. Brown had lost her husband and two younger sisters.

In several rounds of letters and telephone calls, Mrs. Capistran obtained authorization from the Welfare Department for Mrs. Brown to move to a better apartment. Mrs. Capistran made all the moving arrangements and later secured homemaker services.

She then helped Mrs. Brown to join a day-care center which provides transportation, a meal, recreation, and social activity.

"We are in touch with the social worker and nurse there almost daily," Mrs. Capistran said. "This support has made a real difference. She could so easily have fallen by the wayside."

Without such concern, would Mrs. Brown have been in a nursing home by now, with a loss of morale to her and at great expense to the public? No one knows. But it was soon apparent at the Chelsea Center that after the grant expired, the case coordinator would stay.

Mrs. Capistran, left, assists Dr. Jeane Kelly during a home visit to a 76-year-old bedridden patient.

Blood Ailment Stops Patient's Heartbeats

(Continued from Page 1)

As a consequence of his many visits, he and the doctors and nurses who minister to him have developed a close personal relationship. The staff believes after extensive studies that it has found effective ways to control his rare condition. Mr. Cochrane's awareness of this and of the staff's special interest in him is a source of much comfort.

The first time he was taken to the hospital, his heart stopped as he was being wheeled from an ambulance into the Emergency Ward. He failed to respond initially to external cardiac massage, but with the aid of a blood-expanding drug a team of physicians and nurses managed to restore his heartbeat and circulation.

He lay unconscious for the next few days in the Baker Memorial Building's Medical Intensive Care Unit. By the end of three weeks he was well enough to go home, but the cause of his shock was still undetermined.

A full year went by before an ambulance returned him to the Emergency Ward, again without an obtainable reading of blood pressure. This time he did not lose consciousness. Although circulation to most of his body had shut down, the little pressure remaining nourished his brain. The body's natural response to protect the brain above all else was thus at work.

Mr. Cochrane rallied and went home but drew even closer to death less than

Miss Barbara Curran, RN, takes Joseph Cochrane's temperature during his 17th hospitalization in nearly six years. Speedy control of his blood ailment reduced his stay to three days.

11 months later. During a third emergency admission, he experienced heart stoppage (cardiac arrest) 12 times in the Baker Intensive Care Unit. House officers and nurses kept him alive by staying at his side continuously for 23 hours.

In the struggle to save him, he recalls that a resident, Dr. Lee Haynes, and a nurse, Miss Mary Kelly, RN, took turns applying manual pressure to his chest throughout the night to keep his heart beating.

"I remember Miss Kelly's wrists were sore for six months afterward," Mr. Cochrane remarked.

As frequently happens in such a desperate lifesaving effort, injury resulted to his ribs. Mr. Cochrane was moved to the Respiratory Intensive Care Unit where his breathing was facilitated during the next month and a half by a mechanical ventilator.

"The nursing care I received in both the Baker and the Respiratory Intensive Care Units was just fantastic," Mr. Cochrane declared. "When you've got something as frightening as I have, the supportive care is almost as important as the direct medical treatments. The nurses not only helped to save me but they also eased an awful lot of my emotional anxieties."

Between his episodes, Mr. Cochrane has a healthy appearance that masks the seriousness of his problem. As a result, not until his third attack did the MGH staff realize that unlike others who have suffered shock, Mr. Cochrane has a highly unusual condition.

His primary-care physician, Dr. John C. Dalton, called for the assistance of Dr. Hyslop.

Tests to uncover possible allergies failed to yield any clues. Also unavailing were tests for a possible glandular problem or a tumor which might be secreting something unexpected. Examination of tissue (lymph-node biopsy) and blood studies conducted at the MGH and other parts of the country eliminated suspicion of an impaired ability of his immune system to respond to infection.

After his third admission the Boston man began to experience attacks more often, reaching a frequency of every two or three months. Paradoxically this allowed Dr. Hyslop more opportunity to pinpoint the rare problem.

Radioisotope studies conducted in collaboration with Dr. Kenneth A. McKusick of the MGH Department of Nuclear Medicine uncovered the serum leakage into the muscles. A 10-year-old report indicating that four other people around the world had died of similar symptoms also was brought to Dr. Hyslop's attention by a colleague, Dr. Harvey B. Simon, of the MGH Infectious Disease Unit.

Two of those patients, it turned out, had died from complications arising from the administration of whole plasma.

The information reinforced a decision Dr. Hyslop already had made to change Mr. Cochrane's treatment from whole plasma to solely the albumin fraction (the chief protein) of plasma.

"Albumin fraction is fairly well-defined material," said Dr. Hyslop, an Assistant Professor of Medicine at Harvard Medical School. "It's much less complicated than whole plasma, yet has the capability of raising the fluid volume in the blood vessels and retaining that fluid.

"Furthermore we suspected that the albumin fraction might contain a missing serum protein which would explain why each of the attacks had been terminated only by treatment with albumin fraction.

"We tried giving him albumin on a regular basis and not waiting for an attack. We began a program of monthly

Shock Is Not a Stroke

Many people confuse the terms "shock" and "stroke."

Shock is a collapse of blood circulation marked particularly by a drop in arterial blood pressure and failure to deliver adequate amounts of blood to vital organs. The drop in blood pressure can progress steadily to irreversible circulatory failure and death.

Shock may follow crushing injuries, a hemorrhage, burns, heart attacks, or major surgery – any condition which significantly reduces the amount of circulating blood or injures the heart itself.

Affecting the brain, a stroke is a condition resulting from either a rupture of an artery supplying blood to the brain or a blockage within such an artery.

Strokes (*MGH News,* June-August 1976) can lead to such problems as difficulties with speech, paralysis of limbs, loss of consciousness, and even death.

Future of Schizophrenics Appears Brighter

A famous doctor once told a class of graduating medical students:

"Care-giving in the face of uncertainty is a major part of a physician's role."

No one realizes this more than the physician who specializes in the study, diagnosis, treatment, and prevention of mental illness.

No psychiatric disorder causes more uncertainty than schizophrenia, a disease of unknown cause. Across the United States, nearly two million people are known to have this condition. Nearly half of those afflicted receive treatment.

Called the most serious psychiatric ailment of adulthood, schizophrenia is marked by emotional, behavioral, and intellectual disturbances often leading to delusions and a general withdrawal from reality.

Schizophrenics occupy between one-third and one-half of all mental-hospital beds. They utilize between 10 and 18 percent of all mental-health outpatient services. The National Institute of Mental Health estimates that the direct and indirect costs of treating schizophrenia total $14 billion annually.

Yet the picture today is far less ominous than it was a quarter of a century ago when most schizophrenics were hospitalized for very long periods, often for a lifetime.

Dr. Seymour S. Kety, Director of the MGH Psychiatric Research Laboratories, has remarked, "We have learned more about relationships between the brain and behavior in the past 25 years than man had learned in all the previous history of civilization."

The laboratories directed by Dr. Kety, Professor of Psychiatry at Harvard Medical School, delve into the biochemical or basic-research aspects of the medical specialty.

Although there still is no known "cure" for schizophrenia, much of the confusion and hopelessness which characterized professional and public

(Continued on Page 6)

treatments. It was an arbitrary schedule because we really didn't know how long the factor in the albumin that was helping him might last.

"Three weeks after the second treatment, another attack occurred. The treatments were quickened to every two weeks. Under that regimen, Mr. Cochrane went six months without a relapse. Then the attacks resumed."

During this time Dr. Hyslop pressed efforts to determine what was causing the leakage through the capillaries. Studies in his laboratory and in conjunction with Dr. Angelina C. Cavalho, Director of the Special Blood Clotting Laboratory in the Hematology Unit, paid off in August 1975.

The research team discovered that Mr. Cochrane's blood was predisposed to an unusual degree of clotting. This tendency, in turn, was somehow triggering a side effect, a permeability factor in the blood, that was causing the vessel leakage.

Dr. Hyslop reasoned that if he could inhibit the coagulation, he could prevent the stimulation of the permeability factor. He prescribed an oral blood thinner. Tests taken after the drug treatment began in August of 1975 showed that the patient's clotting levels had returned almost to normal.

Since then Mr. Cochrane has suffered only two relapses. One on February 8, 1976 required only five or six days of hospitalization, and one on November 19, 1976 kept him at the MGH for merely three days.

"The actual mechanism that triggers his attacks is still being investigated," said Dr. Hyslop, "but his most recent short stay bears out our feeling that we now know how to manage his problem.

"It is fortunate, I think, that the MGH can offer Mr. Cochrane the very special kind of care he needs. And as a consequence we are in a position to learn a great deal more about shock from our study of Mr. Cochrane's unusual illness."

When Mr. Cochrane senses an impending episode, he or his wife, Mary, telephones Dr. Hyslop, and arrangements are quickly made for admission to the MGH. When Dr. Hyslop is away, Dr. Dalton serves as a backup.

"There is also an envelope with Mr. Cochrane's name on it in the Emergency Ward," Dr. Hyslop stated. "If he should arrive unexpectedly, a letter in the envelope will outline exactly what tests to order and which physicians to call."

Mr. Cochrane also carries a copy of that letter in his wallet in the event he is rushed to another hospital. But he considers that unlikely:

"I always stay within an hour's travel time of the Massachusetts General.

"Some time ago I performed at a charity dance and bought a ticket on a drawing that offered a trip out of the country. If I had won, I never would have gone. I wouldn't have dared.

"For a condition like mine, there's no place like the Massachusetts General. If I hadn't been brought here originally, I wouldn't be around today."

Joseph Cochrane's care calls for frequent visits to the MGH's Ambulatory Clinic One to have his blood checked. Mrs. Helen Reid, RN, clinic supervisor, draws a sample for testing.

Drugs Cut Hospital Stay for Schizophrenics

(Continued from Page 5)

attitudes toward the illness has changed.

One major reason is the development of drugs capable of controlling most psychotic manifestations and many behavioral deviances.

"These drugs facilitate the patient's tendency toward remission and improve his capacity for social, occupational, and familial adjustment," said Dr. Gerald L. Klerman, Director of the MGH's Stanley Cobb Psychiatric Research Laboratories, which specialize in research on clinical and biological aspects of disorders such as depression and schizophrenia.

"The widespread use of these relatively safe compounds has contributed greatly to reducing the large number of chronic patients residing in public mental hospitals and to shortening the duration of hospitalization and acute episodes."

In 1955, public mental institutions provided 80 percent of all inpatient care for schizophrenia. Today, community mental-health centers and the psychiatric units of general hospitals treat the largest proportion of schizophrenic episodes.

"The predominant symptoms that respond to drug treatment," said Dr. Klerman, also a Professor of Psychiatry at Harvard Medical School, "are overactivity, tension, hostility, combativeness, hallucination, negativism [stubbornness, for example], and poor sleep.

"Symptoms such as lack of insight, poor judgment, impaired memory, and disorientation are less likely to improve."

Due to extreme interest in schizophrenia and the many challenges it poses to the medical profession, a series of 10 lectures on the subject by as many experts was presented recently at the MGH. The program was coordinated by Dr. John C. Shershow, MGH psychiatrist.

One of the speakers, Dr. Jonathan F. Borus, told of a study, conducted in Louisville, Ky., in the early 1960s, which sought to determine whether schizophrenic patients could be treated at home with minimal psychiatric supervision.

Dr. Borus, Director of Psychiatric Residency Training at the MGH, said a number of such patients about to enter a state hospital were randomly assigned among three groups.

The first was a control group consisting of patients admitted to the hospital as originally scheduled. The second group received home care with nonmedicated pills (placebos). Patients in the final group were given home care with active, mind-affecting agents.

During a 6- to 30-month period, public-health nurses paid regular visits to the home-care patients. Dr. Borus said the nurses found that those taking the active drugs stayed out of the hospital the longest and demonstrated the greatest improvement in mental status, domestic functioning, and social participation.

Dr. Robert Hicks, Director of the MGH Psychopharmacology Clinic, discusses the effects of one of the new drugs used in the treatment of schizophrenia.

"Seventy-seven percent of those who had home care with active drugs were continuously out of the hospital during the follow-up," Dr. Borus said, "while only thirty-four percent of those with home care and placebos could stay out.

"Families of those taking real medication acknowledged that it was a burden to have the patient at home, but at the same time, they agreed that the effort was worth it."

Dr. Borus, Assistant Professor of Psychiatry at Harvard Medical School, emphasized in his lecture that deinstitutionalization will work only if patients are integrated into a community existence that offers as much as what they lost when they left the hospital.

He said indiscriminate deinstitutionalization without providing adequate follow-up services for the patient clearly violates medicine's cardinal rule: "Primum non nocere [First do no harm.]."

"Imposing patients on unready families or on unready and unwilling communities also can lead to a serious backlash against the mentally ill," he warned.

Dr. Borus referred again to the study of the early 1960s to illustrate what can happen when follow-up services are lacking.

"The grant for the study ended after the third year," he said. "The pilot program which had proved itself was abandoned for lack of funds, and the home care was stopped. The patients were left to seek help by themselves at the state hospital or at outpatient clinics.

"Five years after the end of the program, the original investigators went back to check on the status of the patients. They found that there were no longer any significant differences among the groups with regard to psychological tests, vocational functioning, or domestic or interpersonal performances. About 60 percent of the patients had been rehospitalized."

In contemplating whether a schizophrenic patient can reenter a community, one must consider more than simply the assurance of further mental-health care.

Can the patient dress, cook, shop, and otherwise perform the basic social and personal amenities? Are necessary services nearby to help the patient function? Will relatives or friends welcome him?

A schizophrenic is especially vulnerable to change. Inasmuch as leav-

ing the hospital means returning to an environment where he originally had become very upset, the patient must be properly conditioned for the change in setting.

Introduction of the patient to the new therapist who will oversee his post-discharge care could be the first step. While still in the hospital, the patient also could begin a schedule of day treatments, including any newly prescribed medication, in order to acclimate to such a future regimen.

The therapist might take the patient out to visit the home or halfway house where he will stay. At the same time, relatives, roommates, or whoever may share the future home can pose to the therapist such questions as: "What should I expect?" "How should I act?" "Where can I get help if there's a problem?"

Since many schizophrenics do not have marketable work skills, the mental-health delivery system must be prepared to aid the patient financially until he becomes self-sufficient.

While residing away from an institution, schizophrenic patients might go to a clinic or hospital two to five times a week for outpatient day treatment lasting two to six hours during each visit.

The care includes participation in group sessions to discuss a variety of subjects, such as cooking, budgeting, and transportation. The social and living skills that are developed help the patient cope with his community environment.

Day treatment programs serve a second important function. They can monitor the effects of psychoactive medications which have been found to be so important in preventing relapse and rehospitalization. They also give family and friends a respite so that they will not continuously be the focus of the patient's dependency.

The MGH lecture series emphasized that long-term studies are critically needed to assess the full effects of community-care programs for the schizophrenic – effects not only on the patient but also on those with whom he lives and on the community itself.

Meantime, work goes forward to learn the causes of schizophrenia. Extensive investigations conducted overseas by a team led by Dr. Kety, the MGH researcher, bolstered evidence that genetic factors are involved.

The group studied a national sample of adopted individuals and their biological and adoptive relatives for the occurrence of serious mental illness.

Because of improved methods of care, many schizophrenics can look forward to early deinstitutionalization.

They found that the biological parents, offspring, siblings, and half-siblings of schizophrenics, separated from them by adoption at an early age, nevertheless showed a significant prevalence of schizophrenia. However, the adoptive relatives of schizophrenics who shared their family environment but not their genes had no more instances of schizophrenia than the general population.

This represents compelling evidence that genetic factors play an important role in the development of schizophrenia.

The 50 percent risk for schizophrenia in the monozygotic (genetically identical) twins of schizophrenics has also suggested the importance of genetic factors.

These findings in twins and adopted individuals also leave room for important environmental factors which may have to do with psychosocial, physical, chemical, or infectious components of the environment.

Dr. Kety said that the biochemical mechanisms by which the genes express themselves in schizophrenia are still unknown as are the specific environmental factors.

The diagnostic problem is additionally complicated by the fact that signs of schizophrenia can be produced by amphetamines, cocaine, some rare forms of vitamin deficiency, and such diseases as hyperparathyroidism, various forms of temporal lobe epilepsy, and viral encephalitis.

Despite the many complexities, Dr. Kety pointed out that in contrast to the little that was known about schizophrenia 25 years ago, the extent of today's knowledge permits the development of plausible hypotheses regarding the origins of the disorder and their rigorous testing by powerful new techniques.

Bigelows

(Concluded from Page 8)

graduating in 1871, and earned his MD degree from the same university three years later.

He gained prominence both as a surgeon at the MGH and as a lecturer in surgery at Harvard. After his retirement, he served for 10 years as an MGH trustee.

Dr. Bigelow was a long-time personal friend of President Theodore Roosevelt, who almost always stayed at the Bigelow home on Beacon Hill during visits to Boston.

The doctor was an enthusiastic art collector. A bachelor, he traveled extensively through the Far East, amassing an enormous collection of Japanese and Chinese art. In 1911, he presented his collection, numbering some 25,000 items, to the Boston Museum of Fine Arts, of which he was a trustee.

When he died in 1926, Dr. Bigelow left a trust fund to benefit the MGH.

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The Bigelows and American Medicine

Since the MGH was founded 165 years ago, countless people have provided the building blocks with which the hospital has grown.

But the contributions of some to the hospital and to the world of medicine command special recognition.

The MGH has just paid homage to three such persons, a grandfather, father, and son, whose lives span much of America's history as a nation.

The upper eight floors of the 13-story Gray Building have been formally designated as the Bigelow Tower. A plaque dedicated to the Bigelows reads:

A tribute to three generations of doctors for their outstanding contributions to the Massachusetts General Hospital and the fields of medicine and surgery.

Dr. Jacob Bigelow, Physician
1787-1879
Dr. Henry Jacob Bigelow, Surgeon
1818-1890
Dr. William Sturgis Bigelow, Surgeon
1850-1926

Dr. Jacob Bigelow ranked as the leading physician on the MGH staff during his association with the hospital from 1836 to 1855. He was elected president of both the Massachusetts Medical Society and the American Academy of Arts and Sciences.

He was widely acclaimed in his profession for a "Discourse on Self-Limited Diseases." In the words of an MGH colleague, Dr. Oliver Wendell Holmes, the discourse "did more than any other work or essay in our own language to rescue the practice of medicine from the slavery of the drugging system which was a part of the inheritance of the profession."

When a cholera epidemic swept through New York City in 1832 killing some 3,000 people, Boston held its own death toll to 100. History credits Dr. Bigelow with limiting the loss of life by convincing Boston to adopt stringent sanitary precautions.

A graduate of Harvard College and the University of Pennsylvania Medical School, Dr. Bigelow established an enviable academic reputation at an early age. He became Professor of Medicine at Harvard at age 28 and two years later earned a second Harvard title as Professor of Botany, a science he had originally pursued as a boyhood hobby.

Praised as one of America's most learned botanists, he delivered in 1812 the first lectures on botany ever presented at Harvard.

Of five children born to Dr. Bigelow and his wife, Mary, the eldest, Henry, was destined to become one of the greatest surgeons of his day.

As a young man, he dutifully followed the course his father had charted for him, but it was not long after he enrolled at Harvard that he displayed an independence of character.

During a student uprising, anxious parents, including Henry's, rushed out to the college. Dr. Bigelow remonstrated with his son for taking part. Henry reminded his father that there had been a rebellion in his own day.

"Yes," said the father, "but I have seen the folly of it."

"Well, I want to see the folly of it too," came the son's quick response.

Bronze memorial to Dr. Henry J. Bigelow hangs on a wall of the Bigelow Amphitheatre in the White Building.

Henry Bigelow graduated from Harvard in 1837 and from its medical school in 1841. His affiliation with the MGH began five years later and lasted 40 years. He served a similar period as Professor of Surgery at Harvard Medical School.

His career as a surgeon began about the same time as the first public demonstration of anesthesia in surgery. Quick to perceive the magnitude of the historic event which he personally witnessed at the MGH, Dr. Bigelow, although only 27, played a decisive role in securing the widespread use of ether.

For a year or two, Henry Bigelow administered most of the ether used at the MGH. As a result of his pioneering, medicine learned both the advantages and dangers of anesthesia and the precautions needed in its use.

"Without his determination," a colleague said of Dr. Bigelow, "the honor of introducing the great discovery would probably have been diverted from the Massachusetts General Hospital and from the City of Boston."

During his career, Henry Bigelow also became the first surgeon in the United States to remove a hip joint, and he devised a new method of reducing dislocations of that joint.

Still later he developed a safe and effective means of crushing and evacuating stones in the bladder. From time immemorial, bladder stones had been a worldwide curse, crippling people during their most active and fruitful years, causing excruciating pain, shortening life, and making old age an intolerable burden. Dr. Bigelow's method of correcting the problem was acclaimed as one of the era's great advances in surgery.

The third member of the Bigelow family at the MGH was the only son of Dr. Henry Bigelow and his wife, Susan.

Following family tradition, William Sturgis Bigelow attended Harvard,

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MGH News

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Allowing Pills Within the Reach of Some Children

Researchers Study Lungs of Antarctic Seals

An MGH team has returned from the coldest and most desolate region on earth with preliminary data that may point the way toward solving one of life's intriguing mysteries.

Why can certain birds and animals survive in an airless environment for much longer periods than man?

Can the answer help in the conquest of such diseases as Sudden Infant Death Syndrome?

Holding his breath under water, the average human would find himself in trouble after a minute and a half. Free-diving United States Navy frogmen, conditioned for underwater work, can hold their breath for three minutes.

A rabbit or a chicken can do as well.

The muskrat remains submerged for up to 12 minutes; the duck and the beaver for as long as 15.

To gain some insights into such unusual capability, a five-man MGH team of anesthesiologists and technicians, funded by the National Science Foundation, joined with three other researchers to seek out one of the champions of free diving, the Weddell seal.

Indigenous to the Antarctic, the Weddell seal plunges as deep as 1,500 feet to catch fish and may not surface for an hour and 10 minutes.

Even more impressive is the fact that the female performs the feat while pregnant. The unborn baby suffers absolutely no ill effects. And making the Weddells excellent specimens to observe is their habit of returning to the same hole from which they submerge.

Arrangements to study the Weddells (named after an early 19th century British seal hunter) were made with the Science Foundation's Division of Polar Programs.

The Foundation provided facilities for the research group at McMurdo Station, situated near the base of 12,280-foot Mt. Erebus, an active Antarctic volcano only 800 miles from the South Pole.

Comprising the MGH team, which journeyed six days to reach the frozen continent, were Drs. Warren M. Zapol, Michael T. Snider, and Robert C. Schneider, also members of the Harvard Medical School faculty; Thomas Won-

(Continued on Page 4)

When mature, this Weddell seal pup living in the Antarctic will be able to dive to 1,500 feet and remain submerged for more than an hour.

As other members of the family finished breakfast and left the dining room, the cheerful 9-year-old walked over to a side table on which rested eight bottles of multicolored pills.

After fingering most of the containers, she twisted off the caps of several and collected a number of pills. Reaching for a cup of water, she proceeded to swallow six tablets. The remainder were spilled into an empty bottle to be taken to school.

Caroline (Tenny) Donnelly later boasted that so far that day she had taken "one Bactrim, a Riopan, an Aldomet, a Diuril, Prednisone twice, and a multivitamin." By day's end, four more pills would vanish.

Mr. and Mrs. Joseph C. Donnelly, Jr., of Medfield, Mass., have heard the admonition that all medicines should be kept out of the reach of children, but in their home the rule had to be broken to accommodate Tenny.

A bright, bespectacled, brown-haired little girl with an infectious giggle, Tenny typifies a group of youngsters aged 8 to 16 whose health is being closely monitored by specialists at the MGH.

All of the children have received kidney transplants. The postoperative care of each patient requires every day a number of drugs (immunosuppressive, hypotensive, diuretic) to suppress the natural tendency of the body's immune system to reject the new, foreign organ and to control fluid balance and blood pressure.

To ease the burden on parents and provide the young patients with a measure of independence, nurses and physicians in the MGH Transplant Immu-

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EDITORIAL:

An Improved Kind of Health Insurance

From time to time the *MGH News* has presented articles describing how our readers can take better care of their own health. For their part, hospitals do an excellent job of mending the ill. But for many reasons treating the acutely sick is expensive: the increasing technology needed in complex illnesses; the urgency for large numbers of highly skilled, highly paid persons to provide the technology; the necessity to stay open 24 hours a day, 365 days a year; the demand for hospital services by increasing numbers of people; the more efficient treatment requiring more intensive care for the fewer days of a patient's hospitalization; sicker patients; inflationary forces (food, utilities, supplies, wages, etc.). These are some of the major reasons why hospital charges have gone up. Along with the higher bills have come important improvements in what hospitals can achieve in treatment and cures. And finally, hospitals have done much in the struggle against rising costs. At the MGH, for example, more than 20 significant steps have been taken. Some of these measures go back as long ago as a half century.

It is clear, therefore, that partly because of advances in care, the cost of hospitalization – like that of other services such as higher education – has reached a point which should make people eager to avoid entering a hospital. And yet nationwide statistics make it obvious that more and more people are increasingly using hospital services. A major explanation for this paradox lies in the fact that insurance programs usually foot most of the bill. Ultimately, though, the consumer in one way or other pays for the insurance. Knowing this obviously has done little to make us sufficiently concerned about our health bills. If we were, we would take better care of ourselves and do a more effective job of staying out of hospitals in the first place. We would thus join the efforts that hospitals themselves are making to keep costs from skyrocketing.

The article on nutrition in this issue of the *News* is a good example of the role the public can play. Unfortunately, not every American can afford to eat a nutritious meal. For those who cannot our society has to find a better answer to problems such as unemployment. For those who habitually choose candy over vegetables, cake over fish, we can only infer that these persons are making a conscious decision for high hospital costs rather than medicine-free good health. We concede that health insurance these days is a necessity. Additionally, we believe that the care we take of our own bodies is an even better investment.

Self-Care Program Offers Children More Freedom

(Continued from Page 1)

nology Service teach the youngsters how they can guard their own health. Their self-care training program closely resembles that provided the much greater number of adult kidney transplant recipients at the MGH.

"We begin training a child to take medications himself or herself only two days after the transplantation surgery," said Miss Barbara Fulton, RN, Clinical Nurse Leader of the Service.

"Most children like the freedom of their own therapy because, for one thing, their parents no longer have to restrict them on the basis of their disease.

"The child's newly found independence also makes the parents happy because, after having done so much, they no longer have to bear total responsibility at home."

Conducted initially under very close supervision, the training program gradually becomes less intense as the children grow more accustomed to the required routine. They are taught not only when to take a certain pill but also what each tablet is supposed to do.

Prednisone, for example, is one of the more important immunosuppressive agents prescribed for Tenny. Asked what it does, she explained with childlike simplicity, "It helps to fool the body."

Parents follow the training throughout so that at home they can ascertain whether their youngsters are obeying doctor's orders.

Every time Tenny takes a pill she records that fact on a form furnished to her. When she travels to neighboring Dover to attend fourth-grade classes at the Charles River School, she carries the pills along in a special case and eyes the clock to make sure she has her medication on schedule.

In addition to the necessary drugs, Tenny takes her own temperature twice

Photographs: Pages 1, 4 (upper), Dr. Warren M. Zapol; pp. 3, 6, Robert Crivello; pp. 4 (lower), 5 (upper), Dr. Robert C. Schneider; pp. 4 (center), 5 (lower left), United States Navy; p. 5 (lower right), Thomas Wonders; pp. 7, 8, Joel Salhanick.

From eight bottles, 9-year-old Tenny Donnelly collects nearly a dozen pills needed daily to help her body prevent rejection of her new kidney transplant and to maintain general good health. The child carefully records the medication she takes at home and in school.

daily, jotting down the figure she reads on the thermometer. And she weighs herself both in the morning and at night, again recording the data precisely.

Each week, her mother escorts her to the MGH for tests to monitor the effect of her medications.

Tenny, who has an 8-year-old brother and a 12-year-old sister, was born with kidneys that failed to develop adequately. They fulfilled her needs during her early years, but the problem manifested itself as her body grew and demands upon the organs increased.

When it became evident that something had to be done, doctors prepared her for hemodialysis, a mechanical substitute for the kidneys' normal role of filtering impurities from the blood. Availability of a compatible donor kidney, however, made the dialysis treatments unnecessary.

Tenny recalled how her mother suddenly appeared at school one day to tell her that the wait for a new kidney was over. It was time to go to the hospital. Was Tenny frightened at the prospect of a transplant? "It wasn't scary for me," she said. "I was excited."

"She tolerated the procedure well," commented Dr. John T. Herrin, Chief of Pediatric Nephrology (the medical specialty dealing with kidney disease) at the MGH. "A mild rejection less than two weeks after the operation was easily controlled. A more vigorous rejection occurred at five weeks, but an increased dosage of Prednisone reversed that reaction.

"Tenny will need maintenance doses of Prednisone for the rest of her life and will also require Imuran, another immunosuppressant, which she presently takes at night. Most of her other medications will disappear from the scene as time passes." This is typical of most such patients.

During Tenny's five-week stay at the MGH, efforts were made for her to keep up her schoolwork. She not only had the benefit of a tutor but also that of her regular teacher at the Charles River School, who often dropped by to help.

Tenny acclimated easily to the transplant unit, headed by Dr. Paul S. Russell. Miss Fulton reported that each morning the little girl would arise between five and six, prepare a pot of fresh coffee, and serve it to adult patients with an accompanying, "How are you today?" The adults were already up to have blood tests.

Since her kidney, which came from a previously healthy victim of a fatal accident, was functioning normally and her own body was otherwise healthy, Tenny did not require a special diet. Prior to the transplantation, she had complained that she was so skinny her pants kept falling down. "That doesn't happen anymore," she declared.

Steroid drugs such as Prednisone tend to increase the appetite. Most other immunosuppressants have no effect. Tenny weighed 43½ pounds before her surgery. In the next seven weeks she gained 7½ pounds. "I ate my mother out of the house," she said.

A reduction of her prescribed Prednisone dosage has since caused her weight to dip slightly.

After discharge from the hospital, children who have received kidney transplants often return to school within two days, a week at the most. Tenny went back to class for one day, then found herself on vacation for Christmas.

"As far as Tenny's activities go," said Dr. Herrin, an Assistant Professor of Pediatrics at Harvard Medical School, "her only restriction is to avoid any contact sport in which physical trauma to the abdomen is possible."

Kidneys are located on each side of the body between the ribs and the hip. A kidney transplant, however, is placed in an adult's groin area or in a child's abdomen, if the child's groin is too small.

Tenny's surgeon, Dr. A. Benedict Cosimi, Chief of Clinical Transplant Surgery at the MGH, said that "the groin and abdomen offer easier access to major blood vessels to which the donated kidney can be connected.

"Also, the full length of the ureter [the long narrow duct carrying urine from the kidney to the bladder] cannot be removed from the donor. So putting

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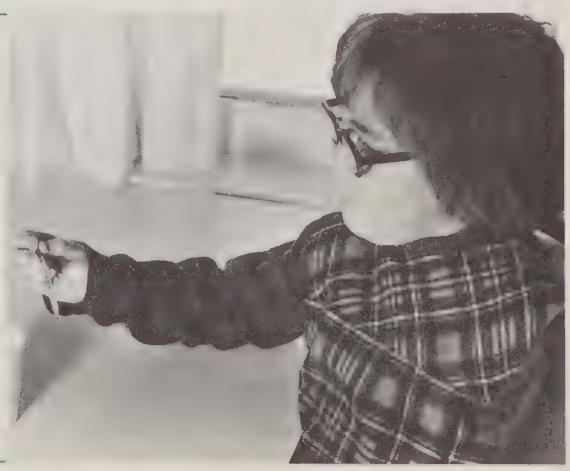
Tenny's MGH training includes taking her own temperature twice daily and jotting down the figure on a special form.



MGH Flight Breaks Solitude of Long Winter at McMurdo

(Continued from Page 1)

ders, senior technician in the MGH Membrane Lung Laboratory; and Paul Wankowicz, an electronics designer at the hospital.

They were joined by Dr. Jesper Qvist of Denmark, a onetime MGH Fellow in Anesthesia; Dr. G. C. Liggins of New Zealand, an obstetrician and gynecologist; and Peter Hochachka, Ph.D., Professor of Biochemistry at the University of British Columbia. Dr. Hochachka is currently at the MGH as a Visiting Professor.

As vanguard of the mission, on August 31, 1976, Mr. Wonders and Mr. Wankowicz flew into McMurdo from Christ Church, New Zealand, aboard a ski-equipped airplane laden with sufficient material to furnish an operating room and build specialized equipment.

The flight was the first to McMurdo after the long Antarctic winter when night persists for three months.

"At McMurdo," Mr. Wonders remarked, "the thermometer read 48° below zero and the wind was howling at 48 miles an hour, producing a chill factor of about 130° below."

Once the early arrivers had established the laboratory, and other team members had joined them, the task of carrying out varied projects commenced.

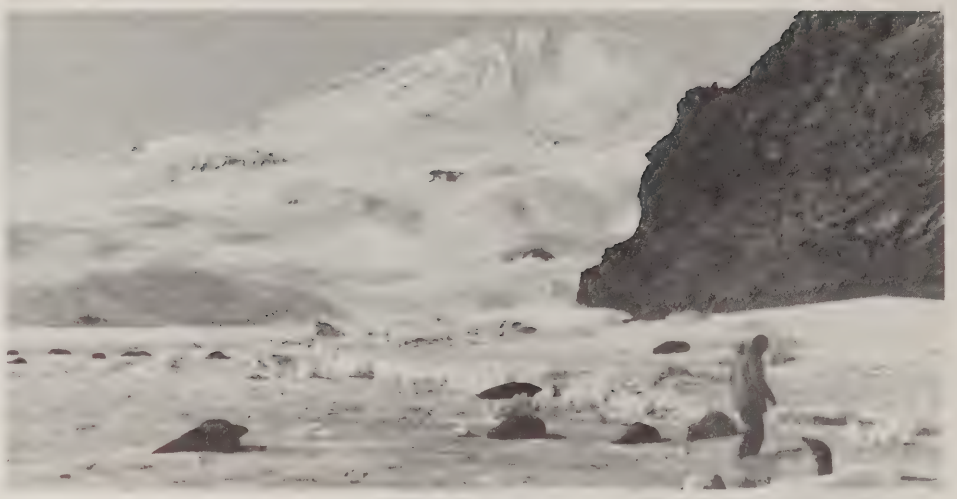
"There were at least five things we wanted to do," said Dr. Zapol. "One was to see whether during diving the Weddell seal preferentially perfused its heart and brain with blood. When a trained athlete dives, his circulation undergoes changes similar to that.

"We also wanted to determine how red cells in the seal's blood bind [unite with] oxygen, what the animal's lung circulation is like, and what kinds of substances are going into and coming out of its brain, heart, and lungs during changes from an oxygen-using to a basically nonoxygen-using state.

"Finally we were anxious to gather data which might help shed some light on the Sudden Infant Death Syndrome."

Dr. Zapol said one theory about S.I.D.S. is that when an infant vomits, he stimulates the back of his mouth and his windpipe. Then, as in a diving reflex, he holds his breath and slows his heart. According to the theory, if the infant's reaction is too severe, he might not recover.

In the laboratory at McMurdo Dr. Liggins stimulated the backs of the mouths of adult seals to determine how they tolerated the sensation and what changes, if any, resulted. The data that were collected are currently being assessed.



(Top photo) Weddell seals resting near the foothills of Mt. Erebus, a 12,280-foot Antarctic volcano. (At right) The team gathered around a statue of Adm. Richard E. Byrd at nearby McMurdo Station. They are (front row, left to right) Technician Paul Wankowicz, and Drs. Michael T. Snider, Warren M. Zapol, and Robert C. Schneider, all of the MGH; (rear, left to right) Drs. Jesper Qvist of Denmark and G. C. Liggins of New Zealand; Peter Hochachka, Ph.D., of Canada; and MGH Technician Thomas Wonders.

Closely protected by its mother is a Weddell seal less than a month old. The young pup one day will weigh about half a ton.

Penguins abound in the area of McMurdo Station, operated by the National Science Foundation.

To capture the 10 male and 8 pregnant female adult seals needed, the team members rode tractor-treaded vehicles across the 6-foot-thick ice of McMurdo Sound to where the seals rested by the side of diving holes.

Each animal was guided into a three-sided sled. With the remaining side dropped firmly in place, the sled was towed to the base. The 1,000-pound seal then was anesthetized and rolled onto a mobile operating table. Next the men maneuvered the table into the laboratory, where breath-hold and other tests could be carried out.

While the seal slept, its head was put through a round opening in a plywood board which formed one side of an otherwise square glass-paneled tank. After the seal fully awakened two or three hours later, the tank was filled with sea water borne to the laboratory in 50-gallon drums.

"To create a natural environment for the seal, we used the same cold water and ice in which it normally swam, and we dropped the laboratory's temperature to just above freezing," said Dr. Snider.

"The breath-hold was the same as if the seal were diving, but the water pressure was necessarily absent. We had to sacrifice the pressure because the very complex measurements we sought could only be obtained inside the laboratory."

Before the breath-hold tests, the researchers knew that the seals had at least two underwater advantages over humans. Oxygen-carrying blood in a seal represents 14 percent of the animal's considerable total body weight. This compares to a blood volume of only seven percent in a human. Red cells also comprise two thirds of each quart of blood in a seal, whereas in a human the cells make up one third, the rest being plasma.

By December 12 of 1976 when the last members of the research team left the ice-covered continent, the investigators had recorded a wealth of information about the physiological changes that seals experience during the deepest dives of almost any mammal known to man.

The bulk of the data must be sorted out, studied at length, and reported in a scientific journal, but Dr. Zapol commented:

"One of the striking things we learned is that the seal's lung serves as a conditioning organ in the body.

"Peter Hochachka found that during a seal's dive the metabolic machinery of its lung cells conditioned blood for both the heart and brain.

"Peter's studies also showed that a seal's enzymes and tissues adapt remarkably well to a high-acid situation. Breath-holding leads to an accumulation of excessive acids in the blood.

"And regional blood-flow studies have provided clear evidence as to which of a seal's organs receive considerable blood during a dive and which don't. More will be said about this after we have analyzed the data."

Can any of the findings from the Antarctic research be applied to man? "At this early point I think they only indicate in which direction future studies for man might turn," Dr. Zapol said.

"Some of the evidence from our seal studies suggests that we should look at how the human lung conditions metabolism during various states of altered human blood flow, such as shock or suffocation."

Dr. Zapol and his colleagues plan to return to the bottom of the world next October to uncover more secrets of how the unborn Weddell seal survives the long, deep dives of its mother.

Researchers on frozen McMurdo Sound guide adult seal into a sled to be towed to their base camp. At right, the seal is prepared in the investigators' laboratory for breath-hold tests simulating diving conditions.

Children Tolerate Kidney Transplants Better Than Adults

(Concluded from Page 3)

the kidney nearer to the recipient's bladder is important."

Dr. Cosimi, who has performed about 150 kidney transplantations, said children fare much better in this type of surgery than adults. He estimated the national long-term survival rate of cadaver kidneys in adults at 50 to 55 percent compared with an 80 percent survival rate in children.

"Generally speaking, children are better able to tolerate the side effects of the high-dose, toxic drugs that we have to give them," explained Dr. Cosimi, Assistant Professor of Surgery at Harvard Medical School.

Physicians and nurses never cease to be amazed at the spirit and vitality that children display after a successful transplantation. Once pale and sickly looking, they often cannot be held back when their kidney function becomes normal.

Dr. Cosimi said he has had patients who even went skiing days after they left the hospital.

Dr. Herrin told of a little girl who received an adult kidney at the MGH when she was but 2 years old. During a checkup a year later, she was asked how she felt. She responded by doing a somersault and a headstand.

Every time Tenny takes her temperature at home, she also weighs herself. She received a little help to manage this hospital scale.

Nurse Clinician Barbara Fulton, RN, helps Tenny Donnelly get acquainted with a specially prepared booklet outlining facts that kidney-transplant recipients should know.

Study Shows Need for Nutritional Education

(Continued from Page 8)

ommended Daily Allowance of protein and seven major vitamins and minerals per serving. Information on cholesterol, unsaturated fat content, and sodium (an element in salt) may also appear.

Do consumers understand the nutritional data? Do they find it helpful? In 1975 these questions were put to 1,664 food shoppers on behalf of the federal Food and Drug Administration.

Respondents with at least a high school education indicated a good understanding of the information. Those with less schooling did not.

Among those not high school graduates, only one in three had noticed the nutrition labeling and less than one in five had used the data. Only a third of the nongraduates understood references to carbohydrate and cholesterol while over half of the graduates were able to comprehend.

Sodium-content statements confused four out of five nongraduates and more than two out of five of the graduates as well.

"Educating the public is one of the biggest problems we face," said Miss Jane Gillis, R.D., dietitian in Ward 4 and for the second year chairman of The Massachusetts Dietetic Association's National Nutrition Week (March 6-12).

"There is no secret to a well-balanced diet," she said, "but there is so much misinformation around to confuse the public. Misleading advertisements and claims, particularly those affecting children, are very detrimental.

"A main purpose of National Nutrition Week is to help people identify sources of reliable information on the subject.

"For example, The Massachusetts Dietetic Association maintains a free service called 'Dial-A-Dietitian.' A person may dial a telephone number listed in the Boston directory and pose any question on food composition or normal nutrition.

"A special committee of professionals considers the question and within 24 hours a registered dietitian responds with a return call."

Miss Gillis stressed that proper nutrition simply involves selecting foods daily in recommended amounts from each of the four basic food groups – meat, milk, vegetable-fruit, and bread-cereal.

"Too many Americans ignore this fundamental rule," she said. "The individual who orders a hamburger, French fries, and soft drink for lunch would be better off substituting a salad for the fried potatoes and skimmed milk for the soft drink."

She added that many Americans consume far too much animal protein

(meats, eggs, cheese). Such diets contain large amounts of cholesterol and saturated fats. Evidence points to excessive cholesterol and saturated fats as a cause of atherosclerosis, a frequent precursor of heart attacks.

A fatty alcohol, cholesterol does perform vital functions in the body. It forms part of the membrane surrounding every human cell, helps to protect nerve fibers, and transports fats which the body uses for energy. A recent Framingham, Mass., heart study indicates that one form of cholesterol actually fights atherosclerosis. Nevertheless, the body itself produces 70 percent of the cholesterol it needs. Very little must come from the diet.

Eating large amounts of fibrous foods such as whole grains, vegetables, and fruits has been touted as one way to reduce levels of cholesterol in the blood. However, recent studies failed to prove this much contested idea.

"Fiber is important in other respects," said Dr. Warren Point, MGH physician and Assistant Director of the Medical Department at Massachusetts Institute of Technology.

"There's good physiological reason to say that if you have a spastic bowel or diverticulosis, an intestinal difficulty, a high- or medium-fiber diet will probably ameliorate your trouble."

People also worry about the additives that are included in many foods to provide extra nutritive value, enhance flavor, or act as preservatives. Although the Food and Drug Administration enforces strict standards in the use of food additives, some "natural-food" advocates imply that additives are poisonous because they are chemicals.

To such charges, Dr. Point retorted:

"During the Middle Ages, rye grain was an important food staple in western Europe. Because of improper storage, the grain often became damp and produced a fungus called *Claviceps purpurea* which then turned into a chemical compound called ergot.

"When people later ate bread made from the grain, they developed ergot poisoning, leading to muscle cramps, lameness, or gangrene in extremities.

"Today, in addition to keeping grain dry, the food industry resorts to compounds such as proprionic acid, a mold inhibitor, to help retard spoilage.

"What it boils down to for the consumer is this: Which do you prefer, a simple food additive or a serious problem such as ergot poisoning?"

Keeping Yourself In Good Shape

Proper nutrition simply means eating foods that meet bodily requirements. In the absence of specific needs the following advice can help guide the healthy adult:

- Each day's total food intake should include selections from all four basic food groups – meat, milk, vegetable-fruit, and bread-cereal.
- Fruits, vegetables, and whole grain products should account for a generous percentage of the day's caloric consumption.
- Avoid foods high in cholesterol, saturated fats, salt, and sugar.
- To insure proper energy and vitality for the day ahead, you should consume up to a third of your daily food at breakfast.
- Do not substitute a heavy meal for two or more normal-sized ones.
- Try to eat at the same time daily and don't rush through your meal.
- Remember that mealtimes should be pleasant, relaxed occasions. At home, sit at the dinner table, not in front of the TV set.
- If you must have a snack, choose one that carries its weight in food value. Avoid snacks that are high in calories and low in other nutrients.
- Serve children small-sized portions of food at mealtime and let them decide if they want seconds. Some children become fat adults because they are urged to eat more than they really need or desire.
- As people move past middle age, their caloric requirements decrease but their needs for other essential nutrients remain unchanged.
- An adult should strive to maintain for the rest of his life the weight considered normal for him at age 25. This can be accomplished by combining nutritionally sound meals with moderate exercise.
- Avoid shopping on an empty stomach so you will not be tempted to buy attractive but nutritionally deficient foods.
- Remember that poor nutrition can lead to or aggravate many serious physical disorders.

Mealtime, at home or at work, should be a pleasant, relaxed occasion.

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Good Health Demands a Well-Balanced Diet

Twenty years ago, Americans on the average lived longer than people in all but a handful of nations.

The average American male born that year could expect to live to be 66 and the average female, nearly 73.

The latest statistics available (1974) show that life expectancy for the American male has risen to 68 and for the female to nearly 76. However, a score of other countries have marched past America in the competition for longevity.

What has caused the comparative slippage? One probable major factor: changed eating habits. Most Americans today tend to select food on the basis of appearance, taste, and ease of preparation rather than on nutritional value.

According to The American Dietetic Association, the wide-ranging lack of concern for, or understanding of, a well-balanced diet is documented by statistics showing that 80 million Americans are overweight. Of this group, one quarter have gained so many pounds that they are literally gambling with their lives.

Obesity opens the door to such potentially lethal illnesses as high blood pressure, diabetes, heart attack, and stroke. Fat people rate as poor surgical risks.

Dietary habits may prove to be related to the development of some forms of cancer. The National Cancer Institute is supporting research to learn more about these possible links.

Despite a continual campaign to impress upon the general public the importance of eating nutritious foods, those concerned with nutrition find that a significant segment of the nation's population pumps more than one billion dollars annually into purchases of vitamin and mineral supplements.

"In most cases these nutrients could be obtained better through a rational, balanced diet of conventional foods; variety in the diet assures a varied supply of nutrients," said Miss Annie Galbraith, R.D., Associate Director of the Dietary Department and Dietetic Internship at the MGH, and immediate past president of The American Dietetic Association.

"Dietitians are frequently confronted with those who have little or no further concern for their nutritional health because they are consuming one source of a fortified food or supplement daily and thus feel reassured that all of their needs have been met."

Various types of surgery frequently do mandate special diets with vitamin or mineral supplements to make up for postoperative deficiencies in certain essential nutrients, but these diets are closely controlled.

According to Dr. Robert M. Neer, an MGH endocrinologist and supervisor of Ward 4, the hospital's metabolic research unit, 15 to 30 percent of patients who have a partial stomach removal for peptic ulcer develop bone disease due to an inability to absorb vitamin D and calcium properly.

"People with certain intestinal diseases also sometimes have difficulty adjusting their vision when they enter darkness from bright surroundings," Dr. Neer remarked. "This can be cured with injections of vitamin A.

"In addition, some people with severe intestinal disorders incur deficiencies in 'essential fatty acids' needed to keep the skin smooth and healthy and in vitamin K, a substance vital for proper blood clotting."

Dr. Neer warned that excessive use of dietary supplementation can be hazardous to health and well-being.

He cited an instance of vitamin overload in Britain when large amounts of vitamin D were added to each quart of milk and precipitated an epidemic of illness among babies. In the United States a quart of milk has a maximum of 400 added units of the vitamin, an amount which is safe and necessary to prevent vitamin D deficiency.

To facilitate proper balancing of a diet, manufacturers of many packaged foods fix nutritional labels to their products. The buyer is told the serving size, how many servings per container, and the amount of calories, protein, carbohydrate, and fat per serving.

In addition, the statement gives the percentage of the United States Rec-

(Continued on Page 6)

Variety in the diet assures a varied supply of essential nutrients.

MGH News

Vol. 36 No. 3 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1977

New Tests Spot Early Signs of Multiple Sclerosis

Some Medical Students "Go Far" in Training

The ashen-faced patient, a 45-year-old used-car salesman, arrived at the Emergency Ward leaning on his wife's shoulder for support and grasping his abdomen.

"It's a hot, burning pain," he explained, "like my stomach is on fire. Sometimes I vomit, and the pain subsides but only for a while."

"Does eating a meal affect your pain?" he was asked.

"I feel best right after a meal, especially when I have ice cream for dessert."

"When did you get this pain?"

"It started about a week ago after a night of card-playing with the boys. Actually, though, I've been getting pains like this for a number of years. It began when I was in Korea. It gets particularly bad when the new model cars come out in the fall."

After more questions and answers, and a study of findings from a preliminary examination, a tentative diagnosis was given: "I think you have an ulcer."

"What kind, Doc?" inquired the patient.

"Probably a duodenal ulcer."

The above event did not occur in any emergency room. But the exchange of words did take place. The "doctor" was a medical student in Germany; his "patient," a computer, more than 3,000 miles away at the MGH.

With the world being made ever smaller by advances in communications technology, medical education is no longer confined within the walls of universities or teaching hospitals.

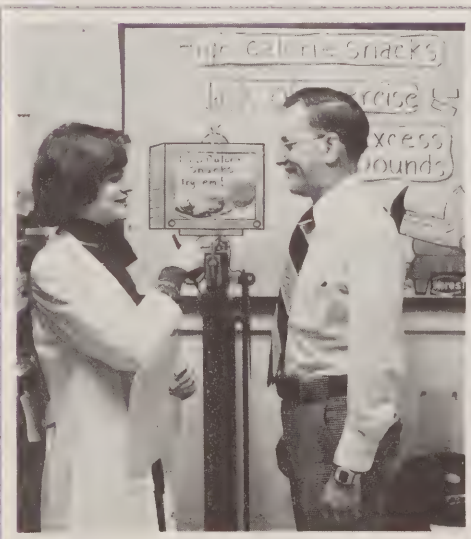
Today, to expand their experience in solving patient problems, thousands of medical students communicate with computers located at the MGH and at Ohio State University College of Medicine to tackle simulated medical challenges.

The Health Education Network, Inc., as the telecommunications system is called, has 75 nodes or local access points in major cities throughout the United States. Individuals in Canada, Mexico, and Germany also use the service on a regular basis.

Besides providing information about a simulated patient, the computer permits the student to interact with the patient, to make decisions, and to take actions to which the patient responds.

The computer also assumes the role

(Continued on Page 4)



Miss Nancy Goetz, R.D., Nutrition Clinic dietitian, regularly checks weight of dieters in MGH program to assess their progress. Story on page 8.

Beset with episodes of leg fatigue, impairment of equilibrium, and blurring of vision, a successful 35-year-old Massachusetts businessman sought help from his family physician.

After conducting a series of tests and asking many questions, the doctor suggested to the patient, "You've been working too hard. You ought to slow down."

Despite an extensive checkup, he could detect no physical abnormalities. Still, the symptoms of a disorder persisted. The businessman went to other doctors, but their conclusion coincided with that of the first.

The patient became very upset and discouraged. He knew that he was ill, but no one seemed able to help. His family and friends began to think that he was neurotic, a "little odd," as he put it. Consultations with a succession of psychiatrists followed.

Still unable to find any relief, the frustrated patient stopped seeking medical help. "I've been to doctors so many times," he lamented. "I guess I've just got to suffer." Perhaps, he thought, his relatives and others were right, that he was simply imagining things. All this occurred 10 years ago.

Some years later, the truth emerged. The symptoms evolved into telltale signs of neurologic abnormality, such as abnormal eye movements and altered reflexes. During another examination, a sample of spinal fluid obtained by means of a lumbar (spine) puncture uncovered evidence of multiple sclerosis (MS).

Treatments with corticosteroid drugs resulted in partial relief of symptoms.

To aid in the diagnosis of MS today,

(Continued on Page 2)

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EDITORIAL:

Diagnosing and Treating MS

Neurologic disorders rank among the most mysterious in medicine. Their origins are usually unknown. The general public seems to have little understanding about them. Of all the diseases of the central nervous system, multiple sclerosis is one of the most familiar. An estimated 250,000 Americans are affected by this progressive illness. Many more may have early-stage cases. Like most of the neurologic conditions, MS is of undetermined origin. Of the many theories certainly one of the most intriguing is that a very slow-acting virus causes multiple sclerosis.

At least two very slow viruses are being studied because they may prove similiar to the suspected villain in MS. One is scrapie, a virus that attacks sheep. The other is kuru, a virus peculiar to certain cannibals. Whether either of these leads will be helpful in unraveling the enigma of MS is, of course, uncertain. Many other types of MS research projects looking into different theories are being carried out at numerous centers like the MGH. One possibility is that MS may represent a reaction against one's own body (autoimmune disease). While some investigators seek the causes, some are looking for improved treatment. Still others are trying to find better diagnostic tools. The problem is that in its early stages MS is often confused with various conditions. Prompt diagnosis means early treatment which can help patients manage their symptoms. At the same time, the correct diagnosis prevents people from thinking they have mental disorders, or other illnesses, or that they are imagining their symptoms.

A page 1 article in this issue describes two tests developed elsewhere but being applied at the MGH, and a third one being improved here. If the efforts on the third are as successful as they at this stage give promise of being, the neurologist will at long last have some excellent tools to diagnose MS in its early, less typical stages. Already the other two tests have made significant progress along that line.

Research into a cause as well as a breakthrough in treatment are not, of course, as far advanced. Nevertheless the investigations are at least promising enough to keep the candles of hope burning brightly.

Patients Take New MS Screening Tests While Totally Relaxed

(Continued from Page 1)

the MGH is administering two new tests. The hospital first used one of them with patients about a year and a half ago. Only last September, the other came onto the MGH patient-care scene. These two tests are the first MS diagnostic screenings that are totally painless and harmless.

Had the procedures been available years ago when the businessman was first stricken, he could have escaped the discouragements, exasperations, misunderstandings, and heavy expenses that he was forced to bear.

MS is a progressively disabling disease of the central nervous system, mainly striking young adults between 20 and 40 years of age. More than 250,000 Americans are affected, and it is estimated that another 500,000 are at risk for the condition. Its cause and cure are unknown.

Imagine the brain and spinal cord as being made up of large telephone trunk lines. An insulating material covers each wire, representing a nerve, to insure proper conduction. Instead of being made of rubber, the insulation consists of myelin, a complex substance containing fats, proteins, and sugar.

MS at first nibbles away at the myelin in multiple places (foci, called plaques by the French); hence multiple sclerosis (or sclerose en plaques). Later the nerve fiber within is damaged. The result may be altered neurologic functions such as paralysis of a limb, loss of sensation, defective vision, speech problems, tremors, and difficulty in maintaining balance.

One hundred years ago MS often was referred to as Charcot's Disease, named for Dr. Jean Martin Charcot of Paris, one of the fathers of neurology. Even then physicians realized that some patients with seemingly excessive complaints eventually turned out to have multiple sclerosis.

In its earliest stages the disease was so difficult to diagnose with anything approaching absolute certainty, however, that physicians, including experienced neurologists, frequently elected to

Photographs: Pages 1, 3, 4, 7, 8, Joel Salhanick; p. 5, Dr. Alexander Leaf; p. 6, Dr. Bertram Zarins.

To detect any symptoms of multiple sclerosis, Dr. Keith H. Chiappa, MGH neurophysiologist, and Miss Ann Norwood, research assistant, conduct, "Brainstem Auditory Evoked Response" test of patient resting in nearby room.

defer decision, i.e. to "sit tight." "Maybe this is going to turn out to be MS, maybe not," they would say. "Time will tell."

"For the most part, this condition is now quickly diagnosable," said Dr. Robert R. Young, MGH neurologist and Director of the hospital's Clinical Neurophysiology Laboratory. "The new tests can show lesions or abnormalities not readily apparent previously. Before the MGH began employing these tests routinely, they were available here only in the research laboratory."

The diagnostic examinations are called the Pattern Shift Visual Evoked Response (PSVER) and the Brainstem Auditory Evoked Response (BAER). Both were developed in the neurophysiology laboratory within the past five years, the PSVER at a large neurologic center in London and the BAER at research facilities in California.

Using the two tests now to examine an average of 60 patients a month, the MGH has quickly adopted these innovations.

At the same time, with financing from the Edwin Minot Fund for Research in Electroencephalography at the MGH, Dr. Young and his colleagues are carrying out studies to advance a third test to clinical prominence.

Called the Short Latency Somatosensory Evoked Response (SLSER), it has the potential to provide even more information with which to evaluate nervous-system function.

The PSVER scans the optic nerve for a possible lesion. The patient sits in a chair with electrodes applied to his scalp and watches an alternating black and white checkerboard pattern projected onto a small screen. A mirror arrangement which turns about twice a second causes the pattern to jump to the left and right. The sight of the shifting pattern thus stimulates the patient's brain.

Electroencephalographic (EEG) equipment records electrical activity produced by groups of neurons, or nerve cells, following stimulation of the visual sensory system. With modern equipment a computer refines the EEG recording by eliminating irrelevant background noises which show up in the EEG activity.

The BAER, or auditory, test utilizes the same equipment in studying the brainstem (which connects the spinal cord and the cerebrum, the main portion of the brain). The patient lies on a bed and wears earphones. His brain is stimulated by the sound of little clicks repeated anywhere from 10 to 30 times per second.

"Neither test requires any particular cooperation on the part of the patient," said Dr. Young, an Associate Professor of Neurology at Harvard Medical School. "The individual undergoing the visual response must look at the screen, but it makes relatively little difference if he becomes a little drowsy and his mind wanders. During the auditory response, we actually encourage the patient to fall asleep."

From July 1975 through June 1976, some 350 patients underwent the visual examination in Dr. Young's laboratory, and MS abnormalities were found in at least 100 persons.

"The visual test is the one we use the most," Dr. Young said, "because it is easier to do, and for reasons that are unclear the optic nerve is more often affected in MS than the auditory pathways.

"However, examination of the inch-long optic nerve can show only one lesion. An auditory study of the brainstem, which is about two inches long, can unveil more than one area of damage. Therefore, the auditory response can speed a diagnosis."

When the third test – still in the research stage here – becomes available, it will deal with the entire nervous system, which is at least two or three feet long. Presumably much more information could thus be revealed.

"Multiple sclerosis has a very bad name," Dr. Young declared, "because people have heard about those who end up in wheelchairs. Also, while some medications are helpful, they're not a cure, and not even a guaranteed treatment.

"Nevertheless, the fact is that close to 75 percent of MS patients do extremely well. The disorder is by no means a universal crippler."

Another MGH neurologist and Associate Professor of Neurology at Harvard Medical School, Dr. David C. Poskanzer, who is investigating the high incidence of the disease in islands off the coast of England, agreed.

"For every patient who comes to the office in a wheelchair," Dr. Poskanzer wrote, "there are four or five who walk in and who would not be recognized as having the disease at all . . . .

"Many patients have gone 30, 35, and 40 years without any further increase in neurologic problems or disability following a confirmed diagnosis of multiple sclerosis . . . .

"Most patients with multiple sclerosis marry, raise families, and have a full and rewarding life."

Dr. Chiappa takes photos of evoked response for analysis of patient's condition and for a permanent record.

Network Offers Some 30 MGH Tests

(Continued from Page 1)

of the supervising physician by providing consultation and guidance. The student merely has to request assistance to receive it.

Throughout the project, whether the problem-solving takes 15 minutes or, in a more complex set of circumstances, over an hour, the computer assesses the student's performance. Later, it may provide the student and his instructor with the evaluation and suggest remedial work if that is indicated.

To take a test in patient-care problem-solving, the student would sit either at a teleprinter such as this or at a video screen.

"It is particularly important to note that in the simulations, the student has full responsibility for making decisions about a patient's problem and can see the outcome of his actions without endangering a real patient," said Dr. G. Octo Barnett, Director of the MGH Laboratory of Computer Science.

Also, the computer offers a very wide variety of clinical problems to be solved. The patient population in a hospital and the simplicity or complexity of the illnesses to be treated can rarely, if ever, be controlled and selected for teaching purposes. A student may encounter only a few patients for whom he or she has the opportunity of sharing substantial responsibility, under the supervision of a highly experienced physician or teacher.

Approximately 30 programs, dealing with as many different medical problems, are in regular use from the MGH over the Health Education Network. Each program contains a number of different patient-care situations. Since one student's method of handling a patient may vary from that of another, the pathways of problem-solving are almost infinite.

Often several students, sometimes with an instructor, will gather around a terminal somewhere in the United States or in another country and "work up" the same "patient" who exists only in the imagination of the MGH computer to which the terminal of the class is linked.

In such a setting the student may experiment with different diagnostic strategies or different treatment approaches. Since no one is endangered, the trials, whether successful or not, can only enhance the learning process.

The author of each program bears the responsibility of periodic reviews to upgrade the simulations in keeping with advances or "new thinking" in his specialized field of health care. Before a revised version is distributed throughout the network, the program is generally submitted to a national advisory committee for study and approval.

"The author also stands ready to provide personal assistance to any student," said Mrs. Barbara B. Farquhar, Assistant Director of the Laboratory of Computer Science and coordinator of the MGH's computer-based Medical Education Project.

"While doing a simulation, the student thousands of miles away can simply type in a comment to the author. The author will receive the message and file a response which will be sent to the student the next time he or she signs on the system."

During the past four years, persons at more than 150 institutions in 40 states have devoted in excess of 50,000 hours to MGH programs. Currently, about 600 persons utilize the hospital's service monthly.

"Ohio State offers a substantially different set of programs," Mrs. Farquhar said. "Ohio State materials cover basic medical sciences; MGH programs are designed to teach and test the process of clinical problem-solving. We complement one another. An extensive package describing what is available at the MGH and at Ohio State is distributed to potential users of the Health Education Network."

Dr. Barnett was a pioneer in the concept of supplementing traditional medical education with computerized simulations in patient problem-solving. The MGH began its own "in-house" service in 1971 (*MGH News,* April 1971), offering two or three programs to medical students and staff personnel.

The principal program dealt with cardiopulmonary resuscitation and was designed specifically for nurses and others in the hospital who served on emergency-care teams.

Originally drawn up for the treatment of adults, the cardiopulmonary resuscitation procedure has since been developed to include care of children as well.

Soon after the MGH initiated its computerized teaching programs, the National Library of Medicine's Lister Hill National Center for Biomedical Communications expressed interest in establishing an experimental network.

A computer which contains the medical teaching programs is prepared for operation by Miss Marion Cameron, systems analyst in the MGH Laboratory of Computer Science.

The MGH served as the first operational host when the Experimental Computer Assisted Instruction Network commenced in July of 1972. During the next 35 months, Ohio State and the University of Illinois Medical Center joined in providing programs through access to their computers.

At the end of the nearly three-year period, the Lister Hill Center terminated financial support of the network. Its mandate had been to demonstrate that such a system was technically feasible and that programs developed at one institution could be used successfully at others. These research objectives had been achieved.

When users of the network learned that federal funding was being withdrawn, they banded together, dug into their own pockets, and assured continuation of service on a private, partnership basis.

"Very few institutions could have supported these teaching programs on their own," said Dr. Barnett. "They didn't have the necessary hardware or software, nor did they have medical faculty interested in developing instructional programs. But they realized the value of such an adjunct to medical education."

Today the Health Education Network, user-supported and user-directed, provides access 24 hours a day to the largest instructional medical data base in the world. Although medical students comprise 63 percent of the users, practicing physicians comprise another 20 percent.

To the doctors, the computer-based simulations provide a means for both continuing education and self-assessment. Nurses, dentists, and allied health personnel also benefit from the training opportunities.

Additional ways of using the computer to test clinical competence are being explored. The Laboratory of Computer Science is working with Dr. Henry J. Mankin, MGH Chief of Orthopaedic Surgery, and the American Academy of Orthopaedic Surgeons to design, develop, implement, and evaluate a computer-based Orthopaedic In-Training Examination for residents and practicing orthopedists.

Both the American Board of Internal Medicine and the National Board of Medical Examiners are also developing plans for computer-based mechanisms that will be used to certify, and possibly recertify, specialists in their areas of the profession.

Nonstop 200-mile foot races over hilly terrain while simultaneously kicking a wooden ball are a centuries-old tradition of the Tarahumara Indians.

What Gives Athletes That Special Drive?

Each April 19th, a huge throng leaps from a starting line in Hopkinton, Mass., to run 26 miles, 385 yards to Boston.

Of the 2,000-or-so starters in the Boston Athletic Association marathon, the hundreds who reach the finish line all experience a deep feeling of personal triumph.

In North Central Mexico, however, members of an Indian tribe called the Tarahumaras would sniff at a traditional marathon. To the mountain-dwelling Tarahumaras, a 26-mile foot race would be left to 10 year olds.

The short, wiry appearance of these Indians yields little clue to any championship prowess, but they did not come by their name Tarahumara (fleet-footed) by accident.

Although they subsist on diets that Americans would consider meager, they engage in a ritual of running in nonstop, 200-mile foot races over precipitous terrain while team members alternate in kicking a wooden ball. Since a misplaced drive would send the ball tumbling over a mountainside, each athlete must manifest utmost finesse as well as stamina.

As the race extends into the night, torch bearers turn out to illuminate the route of the event.

Addressing the MGH Psychiatric Service's Psychosomatic Conference recently, Dr. Chester M. Pierce, an MGH and Harvard University psychiatrist, told of examining a sandal-clad Tarahumara Indian who dropped out of a race after covering 75 miles.

"His pulse was beating at 72, and there were no signs of blisters or redness on his feet," Dr. Pierce said.

Despite the absence of any formal training, the runners also exhibited

(Concluded on Page 6)

Always on the Run

Two years ago, Dr. Alexander Leaf, Chief of Medical Services at the MGH, went to Mexico's Sierra Madre Mountains as part of a team studying the unique capabilities of the Tarahumaras.

"A Harvard scholar who lived two years among these Indians told me that he never saw them walking along the mountain trails; they were always jogging or running," Dr. Leaf said.

Initial efforts to conduct physiological studies ran into difficulty. "We brought along an exercise bicycle to measure the amount of energy the Indians could put out," Dr. Leaf stated. "It never dawned on anybody that there might be people who could not ride a bicycle."

The feet of the tribesmen kept slipping off the pedals, and simultaneously they would burst out laughing. Their feet had to be taped onto the pedals, but by then the Indians were so excited, the studies had to be put off.

While in Mexico, Dr. Leaf heard that a midwestern governor in the United States once invited the Tarahumaras to enter a race he had organized to promote physical fitness. "When the chief of the tribe read the invitation and saw that it was only a 26-mile run," Dr. Leaf said, "he sent a couple of women."

Sports Competition Fulfills Diverse Goals

(Concluded from Page 5)

blood-pressure and blood-fat levels comparable to those found in highly conditioned track men in the United States.

"We make a big to-do over someone running 26 miles," Dr. Pierce remarked. "To the Tarahumaras, running is simply part of their culture.

"They might gamble a whole year's income [mostly corn] on the outcome of a race. Not to bet seriously, they believe, might create an impression that the race had been fixed."

Dr. Pierce said there are numerous historical accounts, some as recent as the 19th century, of tribes which hunted deer by running them down until they were exhausted. "People apparently have much more capacity to do things than they think," he said.

Society has long assumed that sports not only condition a person physically but also develop character, good citizenship, and teamwork, traits that later can be carried into the business world. Learn to be a good sport, the saying goes, and you will play the game of life fairly.

Psychologists have conducted many studies seeking evidence to support the assumed role of sports in personality development, but the results have been inconclusive.

Dr. Jonathan S. Rothman, a second-year MGH resident in psychiatry, spoke of one study which showed that champion athletes scored higher than other team members on scales of aggression, dominance, leadership, and self-sufficiency.

"None of these traits, however, could be attributed to sports participation," Dr. Rothman said. "It could be hypothesized that people with these characteristics would excel in any endeavor they chose."

To determine whether sports alter personality, a study was conducted among 752 cadets entering the United States Military Academy. Four hundred and fifty-four had earned varsity letters in high school. Another 107 had engaged in sports but had not won letters. And 191 were nonathletes.

Initial tests indicated that the athletes were generally more dominant, enthusiastic, adventurous, group dependent, and sociable. Four years later, after all of the cadets had participated in the mandatory athletic program at West Point, the tests were repeated. No significant change in personality could be found in any of the cadet groups.

What drives an athlete on? In Dr. Rothman's view, explanations that people engage in sports for fun are inadequate. "When we look at how much pain and tedium people will endure in order to play sports, we realize that there must also be other rewards," he remarked.

In any such list the following would likely merit prominent mention:

• Sports offer sons a means of demonstrating to parents evidence of skills, strength, and manhood.

• Sports provide an escape from a world which at times appears dull and unfulfilling.

• Hero worship often awaits sports champions.

• In the professional ranks, sports hold out the lure of high income to those who excel.

• Sports provide a socially acceptable format for aggression.

Referring to the needs of some athletes to display physical power, Dr. Rothman pointed out that words of violence dominate the language of several sports, particularly football.

"The football season is known as 'the wars,'" he said. "The Chicago Bears are nicknamed the 'Monsters of the Midway.' The defensive linemen of the Minnesota Vikings are the 'Purple People Eaters.' And the area between offensive and defensive linemen is the 'trenches.'

"Sometimes there's a very thin line between wanting to make a hard tackle and wanting to engage in actual physical combat. Fights flare very quickly in many contact sports."

Dr. Pierce said that a number of professional clubs have long relied on the advice of psychiatrists. "The owners, coaches, and trainers realize that strategy and motivation are generated in a player's mind," he said.

A psychiatrist can sometimes warn of impending danger, such as the susceptibility of a certain player to injury. Dr. Pierce explained that the player's wife may have provoked him so much that he just cannot play with both his wife and a 300-pound opponent on his back.

In consultation with psychiatrists, coaches often customize their treatment of players. To motivate team members, a coach might find that criticism in public will incite one player to better performance while coddling in private will rouse another.

Just as complicated as fathoming what goes on in the minds of players is understanding the sports fan. The very word "fan" comes from "fanatic."

In Baltimore, a 60-year-old man has virtually "adopted" the Baltimore Colts football team. Since 1947, he has not missed a single Colts' home game.

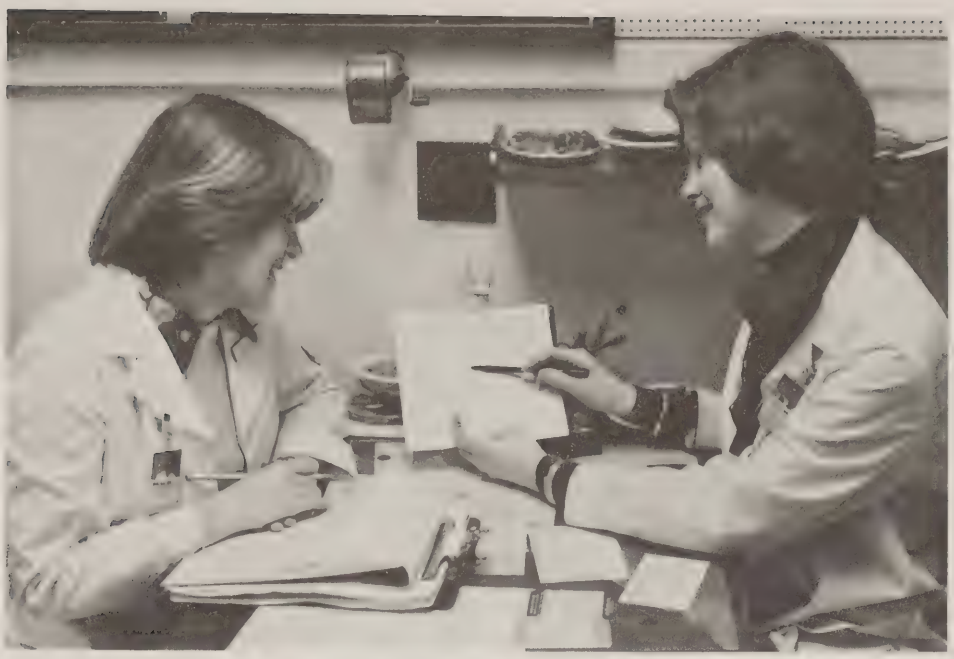
Regardless of the weather or the time of day or night, when the team travels he sees it off and welcomes it back at the city's airport.

On the club's birthday, his wife bakes a cake for every member of the Colts' roster.

Outside their house stands a 30-foot pole atop which the Colts' banner flies daily.

"Sure it's an obsession," the man tells critics, "but what's wrong with an obsession? Maybe it's my way of being part of something."

Some sports have become socially acceptable outlets for aggression.



Miss Nancy Goetz, R.D. (right), dietitian in Nutrition Clinic, outlines to Miss Elizabeth Fitzgerald, dietetic intern, how weight-reducing patients list the food they have eaten, when, and in what kind of environment.

Few Dieters Attain Long-Range Goals

(Concluded from Page 8)

vidual therapy lost in excess of 20 pounds but that group participants lost weight more consistently and in a shorter time.

The dropout rate from both programs has been high. Attendance by some who later withdrew was attributed to curiosity rather than a commitment to diet. Others cited problems of transportation to classes. Still others felt they could not carry on the necessary record keeping.

Although many therapists agree that behavior modification, introduced into the dietary field in the early 1970s, appears to hold promise of lasting weight control, obesity remains one of America's leading public-health problems.

Dr. Lawrence C. Wood, an MGH endocrinologist and internist, said the nation's overall progress in control of obesity can only be described as "terrible. Of every 100 persons who go on a diet today, only a handful will weigh less a year from now, and among those who fail, many will actually add a few pounds."

A number of obese patients have sought Dr. Wood's help in the belief that a glandular deficiency caused their condition. Such diagnoses are rare.

"It has been felt for a long time that an underactive thyroid causes weight gain," Dr. Wood remarked. "Before we were able to test the thyroid with complete accuracy, patients often were given a thyroid hormone that they didn't need. The psychological effect of the pill made the patients feel better so that they assumed they did have a thyroid irregularity. Actually they were fat for one reason – overeating."

Dr. Wood, an Instructor in Medicine at Harvard Medical School, has found that the person who must reduce because of a medical ailment is the one most apt to succeed on a long-term basis.

Frequently when an overweight individual with diabetes lowers his weight to normal, his blood sugar also returns to acceptable levels. People afflicted with high blood pressure benefit in like fashion when they reduce.

Obesity is associated with an increased incidence of gallbladder disease, arthritis, lung disorders, and America's number one killer, coronary artery disease.

What constitutes obesity? Definitions vary among physicians, but they generally agree that if a person is 20 pounds or more overweight he should obtain professional help.

"There's no quick remedy from drugs, however," said Dr. Wood. "Appetite suppressants can be useful at times to tide over someone who has just lost 30 pounds and needs to be encouraged to continue. We may prescribe drugs for a week or so, but there's not that much benefit in the long run – certainly not as much as from behavior modification therapy."

A lot has been written in recent years about an operation known as intestinal bypass surgery. By bypassing most of the small intestine, the area of food absorption, surgeons have enabled some patients to lose significant amounts of weight. But the operation can lead to serious, even fatal, complications.

"It is a major procedure which should be considered only as a last resort in treating extreme obesity," said Dr. Wood. "Any candidate for such surgery should receive a psychiatric as well as medical evaluation to be sure that he fully understands all of the risks as well as potential benefits of such surgery."

In addition to the behavior modification programs offered at the MGH and other centers, there are a number of commercial weight-reducing organizations which Miss Blake of the Nutrition Clinic regards as having merit.

"I think that TOPS [Take Off Pounds Sensibly], Weight Watchers, and Diet Workshop have a role for people who find them convenient and their techniques acceptable," she said.

Both Dr. Wood and Miss Blake emphasized people must accept the fact that long-range success depends on permanent changes in eating habits. This demands an unwavering self-discipline, but the rewards can be a happier, healthier, and longer life.

Making a Diet Count

The successful dieter is the one who not only takes off pounds but also keeps them off. The latter part is the hardest.

To achieve the dual goal, these guidelines can be helpful:

- Successful weight management demands a **permanent** change in eating habits.
- Avoid fad diets. Only one well-balanced in essential nutrients can promise any long-range success.
- While reducing, be satisfied with a loss of one to two pounds weekly.
- Don't become discouraged by temporary cessations of loss.
- Exercise more to tone up your body and keep your mind off food.
- Make mealtime an independent occasion, apart from reading or watching television.
- Eat slowly and refuse second helpings.
- If you must have a between-meal snack, save a part of your regular meal to fulfill that craving.
- Avoid temptation when near a festive table at parties. Your gain is also a loss.

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Dieting Calls for Changes In Life-Style

Although in the prime of life, Helen was a lonely, dispirited young woman with few friends or interests. Her daily routine consisted mainly of eight hours at a perfunctory office job, another few hours watching television, then off to bed.

Inevitably, she became hooked. Not on alcohol, tobacco, or drugs. Her "fix" was food.

Unsatiated by three more-than-ample meals a day, this woman in her early 20s became accustomed to downing high-calorie snacks both at work and at home.

Standing on a scale one day, Helen (not her real name) finally realized that she needed help. At 5 feet 2 inches tall, she weighed 245 pounds – twice what she should have. Her hand-to-mouth existence had to stop.

Helen went for a medical checkup and was warned that she must diet, not only to bring her weight down but also to lower severe high blood pressure.

Referred to the MGH Nutrition Clinic, the patient joined a weight-reduction group supervised by Miss Alma Blake, R.D., the clinic's coordinator.

By assiduously paying heed to the counseling offered at the group sessions and adhering to a food regimen tailored to her particular condition by Miss Blake, Helen dropped her weight in one year to 179 – a loss of 66 pounds. Her blood pressure returned to more nearly normal levels.

What's more, participation in the group produced additional benefits. Interaction with others to achieve a common goal gave birth to a new social life for Helen. She joined a swimming program and also returned to school to train for a more challenging occupation.

Although Helen still has a long way to go in her weight-reduction program, she already enjoys the fruits of success. It has reinforced her will to continue.

A relatively new form of weight management called behavior-modification therapy deserves much of the credit for the long-term improvements shown by Helen and others who have attended the MGH Nutrition Clinic.

"Life seems to revolve around food," said Miss Blake. "If you're happy or sad, active or tired, bored or excited, food somehow becomes a part of the setting. From infancy on, well-intentioned people around you try to induce you to eat.

"The purpose of our program is to train the dieter to study not only himself but also his environment – what influences his overeating, and how he can rearrange things."

One of the most important requisites is to make eating a separate event, apart from any preoccupation such as watching television or reading.

Activity must be an integral part of the new life-style. Walk more; bowl more; swim more. In other words, to keep your mind off food, do more of whatever activity interests you.

"Since many of our patients are grossly overweight, care must be taken that they exercise within safely prescribed limits," said Miss Blake, who holds degrees from Tuskegee Institute in Alabama and the University of Michigan. "Everyone enrolled in our course of 12 weekly sessions must maintain precise records of both food intake and exercise. We review the records frequently."

Each group, numbering 10 to 12 persons, hears lectures on appetite suppression techniques, diet fallacies, and the health implications of obesity. A physical therapist instructs in proper exercising. Weights are checked weekly. The goal is a loss of one to two pounds each week.

Many patients, such as Helen, the dieter who went from 245 to 179 pounds, repeat courses after completion, but Miss Blake pointed out that group participation is not for everyone. Some people must be counseled on a one-to-one basis at frequent intervals and over an extended period of time.

Although the instructional format is similar, group and individual training can lead to different weight-loss results. In comparing the two programs Miss Blake found that more patients in indi-

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Miss Alma Blake, R.D. (top center), Coordinator of the MGH Nutrition Clinic, conducts weekly meetings of a weight-reducing group. Emphasis is placed on diet, behavior modification, and exercise.

MGH News

Vol. 36 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1977

Supplying White Blood Cells Aids Cancer Patient

FOLIC ACID:
An Essential Vitamin Few Think About

About 10 years ago a young expectant mother arrived at the MGH with one of the most severe episodes of "megaloblastic anemia" that the hospital had ever cared for.

The patient's bone marrow was producing enlarged, immature red blood cells incapable of surviving long enough to transport life-sustaining oxygen to the body's tissues.

While at the MGH, the woman went into labor. She was transferred to a maternity hospital where she gave birth to a boy.

In contrast to his mother the baby was not anemic. In fact, a blood specialist said he had never before seen an infant with so high a count of red blood cells.

The mother had become ill from a severe deficiency of folic acid, an essential vitamin. Without it, cells in the body cannot live. What scant amount of the important vitamin the woman's body had was protecting the unborn child.

The phenomenon is analogous to the changes taking place when a person goes into deep shock. Even if his blood pressure falls to undetectable levels, he may remain conscious. As circulation shuts down, the body uses the final bit of pressure to maintain nourishment of the brain.

If the mother's folic acid supply had expired before her baby was born, myriad consequences could have resulted. Among them are spontaneous miscarriage, mental retardation, or physical malformations.

Fortunately the baby did not reach the point of harm, and by taking supplemental folic acid prescribed by her doctor, the mother slowly regained her health.

"The most common vitamin deficiency in the world today may very well be lack of folic acid," said Dr. Richard W. Erbe, Chief of the Genetics Unit in the MGH Children's Service. But Dr. Erbe, a researcher in inherited folic acid disorders, emphasized that the average person does not have to resort

(Continued on Page 2)

Do early characteristics such as inquisitiveness provide a clue to later development? See story on page 8.

To a 20-year-old patient at the MGH, the mention of Harvard University's Adams House will always evoke special sentiments.

The patient, a college coed from Maine, is battling a form of acute leukemia in which irregular white blood cells (leukocytes) proliferate in the bone marrow and threaten to spread throughout the body.

Since treatment for blood cancer depresses a patient's white cells, the normal defense against infection, she was left susceptible to other possible diseases.

In response to an appeal by a Harvard friend of the young woman, a dozen students from Adams House appeared at the MGH and offered to donate white cells from their own blood.

In contrast to the approximately 10 to 15 minutes needed to withdraw a pint of whole blood from a donor, about three hours is required to obtain the white cells alone.

Used in conjunction with antibiotics, the cells donated to this patient have given her a fighting chance to overcome her affliction.

The procedure that has enabled her to utilize the white cells of others was not generally available until two years ago. Today such treatments can be obtained at a number of major medical centers.

According to Dr. Charles E. Huggins, MGH surgeon and Director of the hospital's Blood Transfusion Service, "the experience around the country has been that about 75 percent of patients receiving white cells left the hospital better off than when they entered.

"Considering the type of disease in-

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EDITORIAL:

A Precious New Tool

In recent years the volume of articles published in medical journals has exploded like a hydrogen bomb. The world has an estimated 8,000 medical journals ranging from well-known ones like the *New England Journal of Medicine* and the *Journal of the American Medical Association (JAMA)* to more esoteric publications such as *Arterial Wall* and *Ion Exchange in Membranes.*

In most instances the busy doctor has only a few hours a week to devote to "the literature." Obviously no physician could hope to read more than an infinitesimal percentage of the tens of thousands of medical articles published each year. Typically he might scan two or three general journals like *JAMA,* the *New England Journal of Medicine,* and *Science,* and perhaps two or three journals specific to his own specialty. Sometimes a newspaper article will attract his attention and send him scurrying to the original journal article on which it is based. Other times a colleague will mention an important paper published in an obscure journal he would not ordinarily read. But not even the fastest reader ever born could possibly avoid missing many medical articles of interest to him.

What then does the physician do when he is caring for a patient with a disease for which the doctor knows no treatment? If he is not an expert, he can telephone a colleague. Even though the primary physician is himself an expert, he may somehow have missed an important discovery recently made in a far-off country. While the finding may be experimental, the patient's welfare might with certain safeguards justify use of the technique.

Until comparatively recently the answer would have been *Index Medicus,* a vast series of volumes which list by subject thousands of articles. Using *Index Medicus,* though, can necessitate a laborious search that can consume days. Enter MEDLARS. A page 5 article describes this computerized system which holds a vast reservoir of medical titles ready for the plucking. In seconds from the moment the computer receives the question, lists as specialized or generalized as the case demands come cascading from the computer terminal. The medical library containing the terminal can then supply in most cases the requisite journal.

Obviously the system has limitations. Some of the less known journals in non-Western countries, for example, are as yet unlisted. MEDLARS, however, is a precious new tool in patient care, research, and medical education.

Cooking Food Can Destroy Most of Its Folic Acid Content

(Continued from Page 1)

to dietary supplementation.

"Natural foods can easily furnish all of the folic acid that is required," he said. "The average individual needs only about 50 micrograms – 50 one-millionths of a gram – per day. If we could reorganize our diets to include one salad daily, that would fulfill the requirement."

Folic acid is found in most green, leafy vegetables; certain meats, particularly liver; fresh fruits, and yeast. But utilizing the vitamin is not quite so simple.

Heat from cooking can destroy as much as 90 percent of the nutrient. Milk tends to bind folic acid, attracting the folate molecules in such a way that the body is unable to absorb them from food.

Goat's milk contains a particularly potent binder. In areas of Turkey where children and adults alike consume heavy amounts of goat's milk, striking folate deficiencies are seen.

Alcohol and certain drugs, including contraceptive pills, may impede absorption of the vitamin.

Sufficient amounts of vitamin C (ascorbic acid), obtainable from fruits and vegetables, also are required for the proper utilization of folic acid. Vitamin C serves as a reducing agent, putting its sister vitamin into a form that the body can use.

Most people consume barely enough of the vital nutrient. Because the fetus relies on maternal folic acid stores, as many as half of all pregnant women in the world are deficient in the vitamin.

Today, physicians commonly prescribe folic acid supplements to the diet as part of prenatal care.

This vitamin is also available in multivitamin capsules sold without prescription. Only a few years ago, the federal government prohibited such distribution of folic acid, fearing that it might adversely affect persons subject to seizure disorders because it purportedly impairs the effectiveness of anticonvulsant drugs.

Photographs: Page 6, courtesy of Treadwell Library. All others by Robert Crivello.

In addition, the government contended that folic acid could mask any presence of pernicious anemia, a condition in which patients lack adequate vitamin B12. The two vitamins are closely related, but folic acid deficiency today is far more prevalent than B12 deficiency.

Because of the demonstrable need for folic acid in the general population, the Food and Drug Administration lifted the ban of the nutrient in nonprescription multivitamins. But the government stipulated that the over-the-counter product could not contain more than .4 milligrams of the yellowish-orange compound. For most people that amount is enough to prevent insufficiency.

The deficiency first becomes apparent with the development of anemia. Then the blood's white cells, which fight infection, and blood platelets, substances important in clotting, diminish.

Since folic acid plays a leading role in the production of new cells and injuries speed the manufacture of healthy cells to replace damaged ones, physicians examining patients suffering from injuries routinely test the blood for signs of possible anemia. Extra doses of folic acid, administered intravenously, might be needed to facilitate healing.

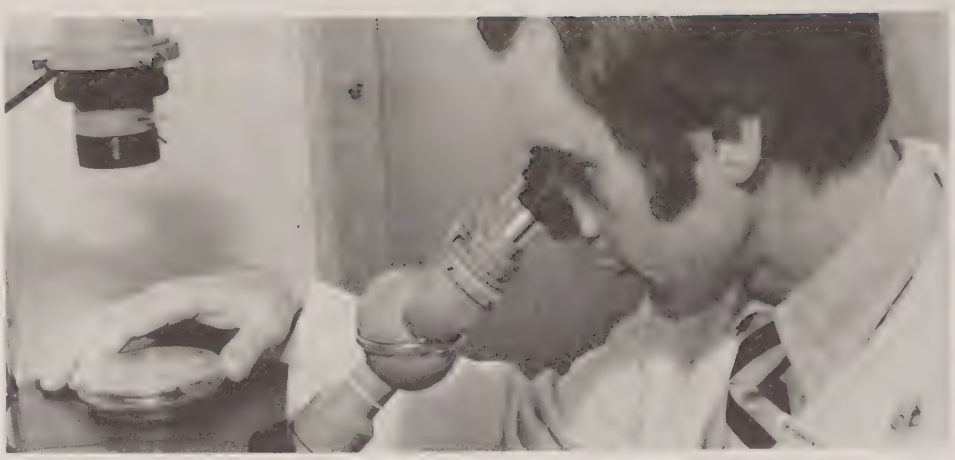
Mental changes such as listlessness, forgetfulness, and irritability, may result from a folic acid insufficiency.

In collaboration with neurologists at Johns Hopkins Hospital in Baltimore, Dr. Erbe has been studying the apparently beneficial effects of folic acid on two sisters who suffer from serious mental disturbances.

"The older of the two presented a schizophrenic picture," Dr. Erbe said. "At times she was catatonic [immobile] and really withdrawn. Conventional antipsychotic drugs brought no improvement, but treatment with vitamins, including folic acid, produced benefits rather quickly.

"In a matter of weeks the girl improved sufficiently to return home. However, her family thought that she was well enough to discontinue the treatment, and within three months she again exhibited schizophrenic tendencies. Back in the hospital, she was given vitamins again, and her symptoms disappeared once more.

"The younger sister also responded well to vitamins when she, too, developed psychotic delusions. The principal benefit to both sisters was felt to have come from folic acid used with pyridoxine, which is vitamin B6."



Seeking evidence of folic acid deficiency, Dr. Richard W. Erbe peers through a microscope in the Genetics Unit laboratory to study skin connective tissue cells (fibroblasts) growing in culture.

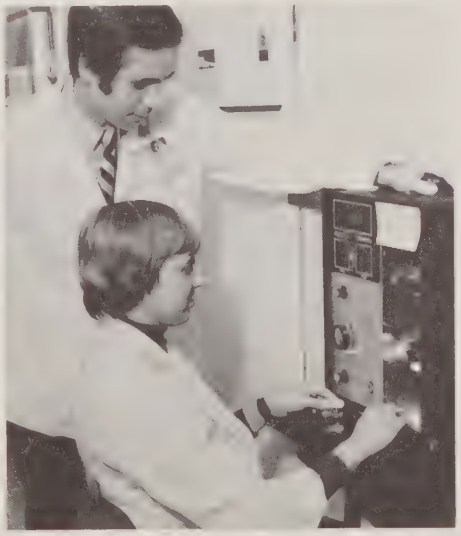
Studies carried out using skin connective tissue cells (fibroblasts) from these sisters indicated that, unlike the vast majority of persons with serious mental illness, the sisters had abnormally low levels of a specific enzyme necessary for the body's use of folic acid.

As a result of this enzyme deficiency, even "normal" amounts of dietary folic acid were not enough for the two sisters. They required especially high levels of folic acid supplements.

In other patients studied subsequently, this specific enzyme deficiency has been found not only in cells grown from a skin biopsy sample but also in liver and other organs. Although probably rare, the exact frequency of this inherited enzyme deficiency is still unknown.

Dr. Erbe said considerable research lies ahead in this field because not all patients apparently respond as fully as they could to folic acid.

"We have not been able to get as much of the particular folate derivative into the nervous systems of these patients as we would like," he said. "We want to know why there is a block to furnishing enough folic acid to the brain."



As Dr. Erbe watches, Mrs. Ann Georgi, Senior Research Technician, operates an electronic counter to determine the number of cells in culture. The presence of few cells could indicate folic acid deficiency.

Prior to 1960, no genetic disorders were known to be associated with folic acid. "Today," Dr. Erbe said, "we think there are at least three and possibly six inborn errors. The number of patients in those categories has doubled in the past couple of years."

At times folic acid deficiency has been confused with iron deficiency anemia, which some people refer to as "tired blood." Dr. Erbe, an Assistant Professor of Pediatrics at Harvard Medical School, explained the difference:

"Iron combines with protein to produce hemoglobin, the red substance in the blood that carries oxygen to the body's cells. When you don't have enough iron, you don't have enough hemoglobin.

"But hemoglobin cannot work alone. It must be transported in a container, a red blood cell, or it will go straight to the kidney. The bone marrow produces those red cells. When the body lacks sufficient folic acid, the production line breaks down, turning out abnormal cells that quickly die."

Since folic acid encounters more than its share of obstacles in trying to serve the body and is sometimes confused with other substances, Dr. Erbe emphasized that its essential role in nutrition must be more widely recognized.

A simple blood test can detect folic acid deficiency. Dietary change, supplements, or both can quickly remedy the problem.

Checkup Prevents Risk to Cell Donors

(Continued from Page 1)

volved, one would have predicted that about 75 percent of the patients would not have made it without the special treatments. So it's practically taking the statistics and turning them around."

The procedure, called leukopheresis, seeks out one of the three general categories of white cells. Physicians have found that granulocytes provide the best challenge to overwhelming bacterial infection.

In the early 1960s, Dr. Tibor J. Greenwalt, presently National Medical Director of the American Red Cross, discovered that granulocytes could be trapped in a certain kind of nylon filter, because they tended to stick to the nylon.

Dr. Greenwalt saw in this a way to remove white cells from blood needed by patients who were adversely sensitive to such cells.

Five years ago, the concept was viewed in a different light by Dr. Isaac Djerassi of the Mercy Catholic Medical Center in Darby, Pa. He reasoned that the same filters devised by Dr. Greenwalt could provide white cells for transfusion into patients who needed them.

Employing equipment essentially of his own design, Dr. Djerassi perfected the procedure. Its adoption by major hospitals, however, had to wait until the necessary apparatus could be manufactured, and the white cells were shown to be beneficial to patients.

"Donating white cells is not very pleasant, and if the donor were not carefully screened in advance, he could encounter some risk," Dr. Huggins remarked.

"For about three hours the donor must lie with arms extended and a needle in each arm. To obtain a meaningful supply of white cells, between 15 and 19 quarts of blood are pumped from the left arm. The blood flows through the filters which catch the granulocytes and then returns to the donor by way of his right arm."

Because of the lengthy time required for removal of the cells, a blood-thinning agent must be administered to the donor.

"If you pumped blood through the tubing without an anticoagulant," Dr. Huggins said, "the blood would begin to clot before it got halfway through. So we must block the clotting mechanism, and we do it with a drug called heparin.

"We have to use as much heparin as is required for an open-heart operation. Therefore if a potential donor has bleeding tendencies, he would not be accepted as a volunteer."

By flushing the filters with an acid plasma solution, the cells trapped by the nylon fall into the solution. After being concentrated, the cells in the solution are administered intravenously to the patient over a four-hour period.

Meanwhile, how does the donor fare after submitting for three hours to an exit of infection-fighting white cells from his blood stream? Ironically, he leaves the hospital with more white cells than when he arrived.

"Once the donor begins to lose granulocytes in the filtration process," explained Dr. Huggins, an Associate Professor of Surgery at Harvard Medical School, "his bone marrow immediately works overtime and turns out new granulocytes at a terrific rate.

"We ask the volunteer to remain in the hospital for an hour after he completes his contribution, but this is simply to make doubly certain that he is all right."

When the procedure was adopted at the MGH, Dr. Huggins insisted on being the first donor. "It seemed wise," he said, "that I serve as a volunteer before I advocate that others fill the same role."

Aside from some discomfort engendered by keeping both arms extended during the lengthy donation period, Dr. Huggins' only complaint was that his nose kept itching.

In screening a potential donor, the Blood Transfusion Service checks whether his white cells are compatible with those of the patient. The latter might have antibodies (infection and foreign-body fighters) which could kill the white cells if they were transfused into his blood.

The donor and recipient should also possess compatible red cells, but Dr. Huggins declared, "If the chips were really on the line, we could still move ahead without an exact match of red cells."

In addition to bolstering one's defenses against disease, white cell injections can lead physicians to the sites of infections that have already set in.

"Physicians frequently locate infections through the presence of pus," Dr. Huggins said. "Pus is formed basically by leukocytes as they attack and consume germs. Many times if a patient has a very low white count, his body cannot produce pus.

"The transfusions correct this, enabling pus to form. Once the physician knows where the infection lies, he can resort to surgical drainage as well as antibiotic treatments."

Conditions other than leukemia can create a shortage of granulocytes. Some

Jack Darnell, Chief Technician in the MGH Blood Transfusion Service, shows how both arms must be used in the extracting of white cells from a donor's blood. Jennie Bering, RN, left, and Judith Marcotte, RN, set up the necessary apparatus. Device at left is a leukopheresis pump.

Tracing Medical Developments by Computer

The child, not yet 6, lay seriously ill in the MGH Pediatric Intensive Care Unit. Her type of illness was relatively unknown until about 15 years ago, and the treatment to which physicians normally turned was far from ideal.

"The little girl was admitted with hemolytic-uremic syndrome," said Dr. David A. Link, Chief Resident in the Children's Service. "That is a combination of kidney failure and an anemia that progresses very rapidly because blood cells are being destroyed."

In the past, heparin, a medication used to prevent the formation of blood clots, has been employed in the treatment but, according to Dr. Link, with limited success and with the potential for adverse side effects.

"It was important to find out quickly if there had been any new treatments tried anywhere that had proved useful in this ailment," Dr. Link said. "Since this was a disease occurring quite frequently in South Africa and areas of South America, as well as across the United States and Canada, the search of medical literature would necessarily be widespread."

Traditionally such searches have been conducted through a guide called Index Medicus, a series of volumes first published in 1879. But in the exploding world of medical articles this could require literally days of effort.

Dr. Link turned to another source, the computerized MEDLAR (Medical Literature Analysis and Retrieval) System in the MGH's Treadwell Library.

Within a half hour he had a list of the world's recent literature on hemolytic-uremic syndrome. In addition to the list of pertinent articles, most of the references were accompanied by abstracts, summarizing the reports.

"We found that another drug relating to anticoagulation had been tried and, at least preliminarily, had proved to be very promising," he said.

The drug, dipyridamole, is an old standby, usually prescribed for another illness.

Using conventional care, without heparin, physicians watched their little patient closely. If her health failed to improve, they might consider applying to the MGH's Subcommittee on Human Studies for permission to administer dipyridamole.

Fortune smiled, and she abruptly took a turn for the better. Eventually, the child recovered fully.

"Although we didn't have to resort to this second drug, at least we had a potential alternative," Dr. Link commented. "If the youngster had not suddenly begun to improve, I think we would have been forced to seek permission for this other mode of treatment."

Dr. Link's experience with the MEDLAR System demonstrated that if research has turned up something new in a particular medical field, the information can be at one's fingertips within minutes. An old drug with new applications that few in the profession ever thought about could surface. And if an experimental drug proved helpful in treating certain maladies, early knowledge could clear the way for hospital approval in time to assist a future emergency patient.

The National Library of Medicine, which produces Index Medicus, also originated the MEDLAR System, which the MGH joined in 1973.

"At that time, very few hospitals had the benefit of this computer-based science information system," said Miss Jacqueline Bastille, Director of the Treadwell Library. "Even today relatively few hospitals have such immediate access.

"While Index Medicus covers some 2,200 journals, MEDLARS can point the way to 3,000 journals containing half a million articles.

"Abstracts for 60 percent of those articles can be requested over the computer terminal. Very often these brief summaries will tell a person whether the report referred to will give him the information he needs. Index Medicus does not contain abstracts."

Once the health professional obtains the list of articles he seeks, he can turn to the shelves of the Treadwell Library and find most of them.

In only 15 to 20 percent of the searches will he have to look elsewhere. He would turn first to the Countway Library of Medicine, operated by Harvard Medical School, in Boston. Failing there, he could enlist the help of the National Library of Medicine at Bethesda, Md. The N.L.M. has been acclaimed as the finest medical library in the world.

Mrs. Helene Leighton, Director of User Services at Treadwell, is assisted by Miss Joanne Wanstreet, Medical

(Concluded on Page 6)

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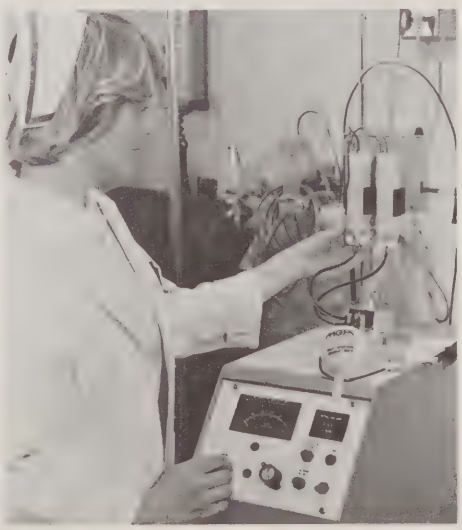
of these difficulties are medication-induced but frequently are self-limited. "If you can tide the patient over during the period when his white count is very low, he can overcome his problem," said Dr. Huggins.

"It's analogous to treating anemia with a blood transfusion. It would be ideal if the bone marrow could make all of the red cells that are needed, but if the rate of requirement is too fast, as may occur during bleeding, then obviously a transfusion is called for."

Under Dr. Djerassi's direction, a new method of extracting white cells from blood is undergoing study. The procedure reportedly would exclude the need for sophisticated equipment to isolate and obtain white cells.



Miss Marcotte checks nylon filters which separate special white cells from donor's blood.

Leukopheresis fits in with a newly emerging pattern in the blood transfusion field: trying to use isolated components of blood rather than whole blood itself.

Much of the whole blood collected by the MGH Blood Transfusion Service is routinely separated into red cells, for treatment of such conditions as anemia; fresh frozen plasma, commonly used to combat a loss of blood volume such as occurs during shock; and platelets, a factor vital to proper clotting.

The need for platelets may stem from either an insufficient output of the substance by the bone marrow, as in leukemia, or a rapid destruction of platelets by certain infectious and other disorders.

Using a MEDLARS terminal, Miss Joanne Wanstreet, left, Medical Librarian in the Treadwell Library, helps Dr. Nancy L. Sprince of the MGH Pulmonary Unit track down needed medical articles.

Computer Uses More Clues to Find Data

(Concluded from Page 5)

Librarian and search analyst, in furnishing the data required by such MGH hospital personnel as researchers, physicians, nurses, and pharmacists.

"Besides its access to wider resources than Index Medicus, MEDLARS will help to weed out unwanted material," Mrs. Leighton declared. "The pediatrician, for example, is only interested in diseases affecting children. Very often, using Index Medicus, he cannot tell whether an article concerns adults or youngsters. We can restrict the computerized search to articles affecting a specific age group."

Assume that someone wanted to find out about a diabetic condition complicated by heart disease. With Index Medicus, he would have to look up a separate list for each affliction. MEDLARS, on the other hand, will crossmatch the articles, narrowing the search to only those concerned with a combination of the disorders.

Whether using Index Medicus or MEDLARS, the search analyst employs a controlled vocabulary, a list of key words, to help locate desired articles. MEDLARS, however, has an additional capability which is much superior.

"There are rare medical conditions which have not become a part of the Index Medicus vocabulary," said Miss Bastille. "And there are diagnostic and surgical techniques which are so new that they also have not yet been listed.

"MEDLARS can find this material by searching for text words in the titles or abstracts to locate articles."

Recently, a surgical resident wanted to gather data about a cecostomy, an operation performed on the cecum, a large blind pouch forming the beginning of the large intestine. Index Medicus could not help. MEDLARS could.

In another incident, a young surgeon was scheduled to give a talk on a rare gall bladder condition. He spent the entire previous night scanning the pages of Index Medicus but found nothing on the subject.

Frustrated, he appealed for help the next morning at the Treadwell Library desk. Use of the computer quickly turned up three articles which supplied adequate material for the lecture.

The search analyst works with the information seeker in developing strategy. "At first, people wrote their requests on a piece of paper and handed it to us," said Miss Wanstreet. "But they soon found that they would get better results if they worked with us at the computer terminal to refine the search strategy."

The search mechanism in the computerized system can respond to questions in as few as 10 seconds.

Sometimes people will search for material they hope does not exist.

"A woman who was about to publish a research article came in recently to do a search," Mrs. Leighton related. "She provided a variety of very complicated facts to aid the analyst. All of a sudden, out of the terminal popped an abstract that was almost a duplicate of the one she had just written.

"A few minutes later, out popped another abstract. 'Oh dear,' she said. 'That's just what I was going to do for my next research project.' "

Miss Bastille conducts an ambitious program to acquaint MGH health care personnel with the valuable services provided by the science information system.

Recently, free on-line, computer searches were offered to demonstrate its powerful capabilities. Today, a charge is assessed to cover communications costs.

Meanwhile, the number of MGH users of the system has risen from a weekly average of 7 to 30. And the number continues to grow.

Searching the volumes of Index Medicus for information leading to specific medical literature can be a time-consuming effort.

Fast-Moving Phases Mark Early Childhood

(Concluded from Page 8)

of you could probably not generate a representation of my face without my presence. That ability is called reconstructive memory."

Between 7 and 13 months of age, babies reach other important new milestones in their development.

At 8 months attentiveness to unusual events increases. Further, the 8 month old will display "Piagetian object permanence." This is demonstrated by waving an attractive toy in front of an infant and letting the infant watch you hide the toy under a cloth. The 8 month old, but not the 6 month old, will reach immediately for the cloth and obtain the toy.

"A baby who is flaccid and ill may not demonstrate this ability until 9 or 10 months," Dr. Kagan declared, "but unless there is serious cerebral damage, all babies will show object permanence by 12 months of age."

After 8 months, a baby also begins to experience certain apprehensions. For example, the 10 month old may cry when his mother leaves the room.

"A younger infant simply forgot that she had been present," explained Dr. Kagan. "But at 10 months the baby remembers her former presence, looks around, and begins to ask himself questions, such as, 'What will happen now?' 'When will mother return?' 'What can I do?'

"If he can't answer those questions, he becomes uncertain and may begin to cry. As he becomes more mature and realizes mother will return, since she has before, the separation anxiety wanes."

Many anxieties that begin at 8 or 9 months and peak during the second year head downward after 2 years of age.

Dr. Kagan said the role of the environment on these fears may speed or slow the development of the thinking abilities that control anxiety. He cited the results of studies he conducted among Indian children living in tiny villages in Guatemala.

These infants are traditionally confined inside huts during their first year of life. Denied a variety of experience, their cognitive development was retarded by a few months.

"But nature keeps its appointments," Dr. Kagan said. "It is difficult to delay for too long these inherited and fundamental sequences."

In Dr. Kagan's view, psychological growth during the first 2 or 3 years of life consists, in part, of the emergence of new phenomena which persist for a short while and then vanish, and some may have no relevance to the long-range future.

He told a story of two sisters, aged 2½ and 3½, whose mother had kept them locked in a room. They were fed every day or two by an older sister. When police found the little girls, they were terrified.

A middle-class couple with several children of their own adopted the sisters. Dr. Kagan followed their progress for the next three years, at which time he moved from their city. "When I left," he said, "it was difficult to tell they weren't normal."

Three years ago, he went back and spent three days with the two girls, who were now 15 and 16 years old. The younger was in high school and doing well. "She had a boyfriend and rode a horse," he said. "I gave her a great many standardized tests, and she was normal in every respect. Yet when I first saw that child at 2½ years of age, she was frightened, asocial, and mute."

Some continuities in development do exist, Dr. Kagan said, but they begin later. Between 6 and 11 years of age children begin to adopt beliefs and habits that supply a good preview of important dimensions seen in adults.

"These are the years," he said, "when the child is mature enough to conceptionalize his role vis-a-vis his peers and his place in the social structure. He begins to identify with the group into which he fits."

The mind of the young child should not be viewed as a recorder full of reels of tape, the professor said, with all experiences recorded in one continuous sonata.

Dr. Kagan does not suggest that early experiences are unimportant. But he said those who claim that what happens to a child in the first two years of life has a profound influence on his future must now defend their hypothesis with evidence, rather than assume its validity on philosophical grounds.

"The hypothesis of infant determinism is up for examination," he said, "and that evaluation is the reason why we use science as one strategy to gain truth. A proper use of social science is to fight dogma, and the view that the baby's actions and affects preview the young adult has been with us for a very long time. It is proper that we subject it to an objective evaluation."

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Does a Child's Past Affect His Future?

"Look at that frightened baby," someone remarked, pointing to an infant who was sobbing, tears streaming down his cheeks. "I can see him as a scared boy when he gets older."

How often have you heard comments such as this?

Long before there were psychiatrists and psychologists, Western philosophers, clergy, and statesmen became convinced that what happens to a child during his first two or three years of life inevitably affects his later development.

Supporters of this philosophical doctrine, called infant determinism, view the mind as a tape recorder which snaps on when the baby is born. Each experience of the child is recorded and related to the next event, creating a chain of continuous information throughout life. Nothing is erased from the mind.

In recent years, researchers have compiled data which call for reexamination of that point of view.

Some of these data were presented at an MGH Grand Rounds in Psychiatry by Jerome Kagan, Ph.D., Professor of Human Development in the Department of Psychology at Harvard University and a consultant in the MGH Children's Service.

"The empirical [by observation] information that has been gathered is still fragile," Dr. Kagan said, "but it leads one to question the doctrine of infant determinism."

In one multimillion-dollar project, researchers studied more than 25-thousand infants born in almost a dozen hospitals. Extensive data were collected on such afflictions that occur both before or around the time of birth as oxygen deficiency (anoxia), transient absences of breathing (apnea), blood poisoning (toxemia), and lack of muscular control (asymmetry of reflexes).

At the age of 4 years the children were given an intelligence test. "If they were middle class," Dr. Kagan said, "you couldn't tell the difference between them and control [normal] youngsters."

Dr. Kagan referred to "middle" class because children from families of different standings in a community cannot easily be compared. The youngsters tend to identify with their families' social background by age 5 to 10 and adopt its values.

The Harvard educator said youngsters from higher economic or educated backgrounds do better on most mental tests, are more willing to cooperate, and generally are a little less frightened.

Recently, Dr. Kagan completed a study that began in 1964. It involved more than 100 children, all first-born, from white families in the Boston-Cambridge area. The infants varied enormously in early temperamental qualities and by 27 months of age had established distinct psychological profiles.

"We assessed the children at 4, 8, 13, and 27 months of age," the psychologist said. "Recently, we saw 65 of the youngsters who had reached 10 years. They varied in reading ability, school achievement, and IQ, but there was no way that we could have predicted these differences from our knowledge of their behavior during the first 27 months of life."

Life begins with a little push from nature. Infants notice colors just as adults do. Babies prefer difference to sameness and movement to nonmovement. None of these preferences have to be learned.

According to Dr. Kagan, however, a baby's memory ability is limited until he is about 7 months of age. If you present a 3-month-old baby with something he has seen before, he will recognize it as resembling a past experience. But he does not enjoy what psychologists refer to as "reconstructive – or retrieval – memory" until he is past 7 months.

Reconstructive memory is the ability to retrieve a past event when nothing in the environment "suggests" it and to hold that information on the stage of consciousness while comparing it with current experience – a process that may resemble what we do when we evaluate the relation between what we know and what is happening to us at the moment.

In addressing the MGH psychiatric group at the nearby Lindemann Mental Health Center, Dr. Kagan offered an example of the difference between recognition memory and reconstructive memory:

"Suppose you were a group of 3-month-old infants, and I returned to this room in five months. Some of you would recognize my face. That is what we call recognition memory. But some

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MGH News

Vol. 36 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1977

A 156-Year Advance from the Past to the Present

Striving to Develop the Finest Surgeons

During its first half century of rendering care to the ill and the disabled, the MGH recorded approximately 8,000 operations, an average of only 160 per year.

In the early 1800s surgery was still in its infancy. Before the advent of anesthesia, first demonstrated publicly in 1846 at the MGH, the speed with which an operation could be performed constituted the measure of a surgeon's ability.

Despite the discovery of painless ways to operate, a profound fear of spreading infection barred incisions into the abdomen, chest, and brain. Not until well after 1867, when Sir Joseph Lister announced his concept of sterilized operating rooms, did the barriers to many aspects of surgery finally topple.

Today, in contrast to the 160 operations a year performed in the early 19th century, MGH surgeons carry out some 23,000 inpatient and another 6,000 ambulatory procedures annually.

After a pain-filled history during which surgery at times was relegated to barbers, mainly itinerant ones, the users of the scalpel rank today as the most thoroughly trained individuals of any profession.

To be certified by the American Board of Surgery, a physician must undertake four years of surgical training (the MGH requires five years); this added to four years of college and four years of medical school.

Some residents, after two years of general surgical work, elect to pursue specialties. Some of these fields, such as urology, orthopedic surgery, gynecology, and neurosurgery, usually take an additional three years. Such areas as plastic surgery and cardio-thoracic surgery will usually extend a resident's graduate program through a total of six to seven years beyond his M.D.

"Being a surgical resident, however, is not like being a medical student," said Dr. Leslie W. Ottinger, Director of the Surgical Training Program at the

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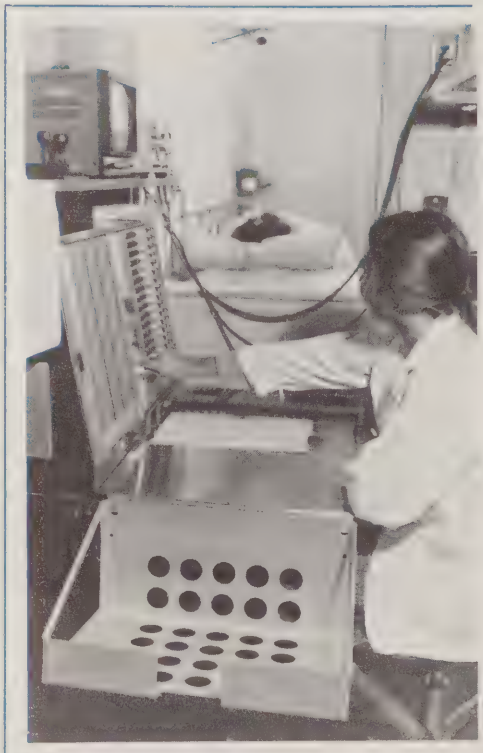

On one of the new Gray floors is the Clinical Neurophysiology Laboratory. Shown is an electroencephalograph recording the brain waves of a patient to detect any possible brain or nervous system disorder.

A time machine is now poised to catapult the MGH a century and a half. A symbol of patient care since its opening in 1821, the hospital's Bulfinch Building will house its last medical ward patients this month.

Designed by Charles Bulfinch, then America's premier architect, the Bulfinch Building in 1821 was considered an outstanding example of advanced hospital planning. In 1977, however, the large open wards are regarded as living fossils, relics of an age when only the poor, when they fell sick, came to hospitals.

Because of its design, the Bulfinch Building could not be transformed into a modern hospital setting that would meet government standards.

Replacing these wards for the care of the ill will be the new rooms in the Bigelow Tower of the Gray Building, constructed in 1968. Left empty since then, several floors of that structure will have rooms and equipment designed to provide the best care possible when its beds will shortly be filled with medical service patients.

Besides the new medical area, the work includes a number of other changes involving the Gray and White Buildings. Increased efficiency and avoidance of duplication will result.

John E. Lawrence, Chairman of the Board of Trustees, and Dr. Charles A. Sanders, General Director, have announced the massive project.

"We will tremendously improve our physical plant without adding a single bed," Dr. Sanders said. "For the purpose of having modern rooms built with the comfort of the patient in mind and for increased efficiency, the move

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EDITORIAL:

A Landmark But Not a Museum

In recent years the MGH has been chosen by teams of "experts" as America's best hospital. Judging quality of care is at best complicated. So many variables enter into a judgment of this kind that any such polls undertake a formidable task.

One of these factors is physical facilities. The third oldest voluntary general hospital in the country, the MGH still uses sections of its original buildings. In fact the granite blocks of the Bulfinch Building which housed the first patient in 1821 still shelter the ward patients in 1977. Thus any high rating accorded the MGH has really been a testimony to the brilliance and dedication of the people who serve the institution. Doctors, nurses, technicians, housekeepers, electricians – the entire range of employees – have contributed to the hospital's high ranking. The best and latest equipment, often designed by these employees, has proved another plus. But surely the hospital's current reputation rests on a different foundation from the old Bulfinch Building itself.

Thus it is of particular interest that the MGH announces that in 1977 it will discontinue using the venerable structure for patient care. With modern quarters by then available, the hospital will be able to offer care in facilities comparable to those in other parts of the hospital. No longer confined by the large open wards, the MGH can provide the same physical surroundings for everyone whether wealthy or poor. Until now the wealthy have benefited from the ability to pay for private or semiprivate rooms while the poor have profited greatly from the medical advantages of ward team care. With the move of the medical wards each patient will inherit the better part of the other's world.

The elimination of the medical wards will, however, mark the close of an era of American medicine. Between the admission of the first patient in 1821 and the transfer of the last patient in 1977, 156 years will have elapsed. Some of the most glorious moments in the annals of medicine have taken place in the Bulfinch Building. One section of the structure, the Ether Dome, became an official National Historic Landmark in 1965. In 1973 the entire building was dedicated by the federal government as a National Historic Landmark. But the MGH is not about to allow this famous edifice to become a museum. After the disappearance of patients, it will continue to serve the public. Research, teaching, and office work will go on within so that outside its sturdy gray walls its Ionic columns can remain a symbol of continuing medical progress.

Early Construction For Later Occupancy Helped to Cut Costs

(Continued from Page 1)

will allow us to consolidate the inpatient facilities that we already have."

Mr. Lawrence said of the new area: "Patients will enjoy a dignity that the old ward setting unfortunately is unable to provide."

In planning the erection of the structure in the 1960s, the trustees decided to leave vacant all but the first four floors. This tactic enabled the hospital to build the high-rise shell at 1967-68 construction costs. By filling in the shell as needed, the MGH has incorporated into the design of the interior the most up-to-date technology. Thus the hospital will acquire a new patient-care area surrounded by an existing shell built at a reduced cost.

An estimated $2 million has been saved on just the new floors. As for the kind of care made possible, Dr. Alexander Leaf, Chief of Medicine, said: "The patient can't help but benefit by a move from a facility that has been in operation for 156 years into one planned to meet the latest requirements of care, the team approach to the patient, and modern technology. This will surely improve the quality of treatment. In the Bulfinch Building we always provided very good care despite the physical plant. In the Gray Building the physical plant will prove a tremendous asset and allow us to do an even better job in caring for our patients."

Traditionally the MGH raised the funds for the entire cost of its new construction, in this case $21 million. The building of the Cox Center for Cancer Management, for example, was financed by gifts from more than 150,000 donors and is within $5 million of its goal.

Construction of the new Gray Building (Bigelow Tower), however, has been financed through a combination of a bond issue under the Massachu-

Photographs: Page 1, Stanley Bennett; p. 3 (upper and center), MGH Archives; pps. 3 (lower), 4, Robert Crivello; pps. 5, 6 (lower), Donald Robinson; p. 6 (upper), MGH Photo Lab; p. 7, courtesy of Dr. John D. Constable; p. 8, Dr. Reid H. Hansen.

When the Bulfinch Building opened in 1821, patients sometimes arrived by boat for medical treatment. The building became a National Historic Landmark in 1973.

setts Health and Educational Facilities Act (HEFA) and contributions from 40,700 individuals whose gifts range from $1 to $500,000.

Besides effecting scientific advances, the move will permit the hospital to achieve a cherished goal.

"This will give us the opportunity," Dr. Sanders said, "to work in accommodations where for the first time we can provide one standard of care across the entire institution. Improved facilities through elimination of large wards will make possible the better integration of interns and residents with senior staff members for the care of all patients.

"Everyone should have the same chance to benefit from the team approach which has developed on the ward service, and which in general has been available only to ward patients. And everybody should have access to the individualized facilities once earmarked for those who could afford them.

"We have been gradually adapting our system of teaching to include the participation of students, interns, and residents in the care of private patients in the same way they have cared for ward patients all these years. For I am sure that at some time in the future all patients in the hospital will be classified as private. In the evolutionary process which this change requires, the private physician will lead the patient-care team instead of making decisions without the benefit of other medical advice.

"Usually his opinion will be the wisest and thus determine the course of treatment. As the private physician he will have the final say. But others will make suggestions. It's this kind of give-and-take that makes for the best patient care. It's a check-and-balance system that affords the patient the benefit of several outstanding medical minds. At the same time it allows the senior physician to renew his knowledge and give the patient the very best care available.

"In a great number of instances we have already developed such a system in many areas of the hospital; what is needed now is the universal adoption of this approach to maintaining excellent patient care and teaching. Indeed, if we do not respond to the challenge of restructuring our health-care delivery and teaching methods for the private patient, I believe the MGH could lose its premier role in training young people to be leaders in their fields while at the same time sacrificing the environment which promotes outstanding patient care."

The early teaching developed in the Bulfinch Building when the MGH was founded as the third oldest voluntary, nonprofit general hospital in the country. Some of the structures surrounding the Bulfinch that were built in the relatively early 1900s also still exist.

Built before James Monroe promulgated the Monroe Doctrine, the Bulfinch Building stressed concepts in vogue in early 19th century Europe. One of these was the large open ward with bed after bed lined side by side.

Even 156 years later this arrangement offers some advantages. From her station in the center of the ward, the nurse can see all the patients. And

(Continued on Page 4)

The Bulfinch Ward, shown at top in 19th century photograph, has undergone little change since its original construction. In lower photo are modern, roomy, semiprivate accommodations provided in the Bigelow Tower of the Gray Building to replace the old wards.

Design of Rooms Assures Patients' Care and Comfort

(Continued from Page 3)

some persons prefer the chummy atmosphere of a large ward.

Yet the times have weighed increasingly in favor of private or semiprivate rooms. A referral hospital like the MGH receives many desperately ill patients who will benefit from the privacy found in the new facility. Similarly, a moderately ill person will avoid the sights and sounds of sicker patients.

A more recent development relating to the practicality of wards came in 1966 when Medicare entitled participants to semiprivate care. With new laws likely to provide the same benefits for other groups, the large ward will probably become a relic.

Instead of the 16 or 18 beds in an open Bulfinch ward, the new Gray Building area will feature air-conditioned, two-bed rooms. Unlike the large wards which may have empty beds because only one sex can be housed there, these small units will permit efficient use of their beds. Patients not requiring intensive care will occupy these 11½- by 23-foot rooms. If privacy is preferred, the patient has the option of keeping the curtains drawn. From some of the rooms the patient can look down on Boston's Government Center and Beacon Hill.

"We designed the new facility several years ago," Dr. Sanders said, "with the patient's needs uppermost. Patient care was the prime consideration, but a lot of thought went into the patient's psychological requirements and comfort."

A new patient care floor in the Bigelow Tower of the Gray Building

Special bedside fixtures will provide the very best light for patient examinations. Beside each bed, outlets will allow hookup of the latest equipment to meet emergencies and for the most modern monitoring devices.

"Enough space exists," Dr. Sanders said, "to adapt to new technology as it comes down the pike."

All the rooms will contain closed-circuit television facilities making it possible to beam medical educational programs tailored to the patient's needs.

All four floors will house two single-bed units for persons requiring isolation. These rooms have a nonrecirculated air system that exhausts to the outside. Someone about to enter will don a sterile uniform and mask. With this system a patient's bacteria will be kept from spreading into the corridors. Conversely a patient requiring special precautions will be protected from the germs of people passing by the unit.

On the eighth floor will be housed the critically ill patients of the medical intensive-care unit. Instead of the cramped cubicles of the present Bulfinch intensive-care rooms, each patient will be located in a 13- by 19-foot room.

Such planning will permit the medical team quick maneuverability among the monitors and emergency equipment now standard for such areas.

"We're talking about a remarkable improvement in physical facilities," Dr. Sanders said. "This will significantly upgrade care."

As in the Bulfinch arrangement, 4 of the 18 intensive-care beds will serve coronary-care patients and supplement the 6 coronary-care beds in the hospital's Phillips House. At a time when such units represented pioneering endeavors, the Bulfinch Building served as the original coronary-care area at the MGH.

"The new coronary-care unit will be an enormous improvement," said Dr. Sanders, a cardiologist in addition to being General Director. "The patients will be housed in a way which will allow them maximum rest and the nurses maximum observation and accessibility in the case of an emergency. There have also been a number of advances in electronics incorporated in the unit, but these represent refinements rather than revolutionary changes."

In all, 72 medical beds will occupy floors 6 through 9 of the Gray Building. Another 15 will move to a renovated area on the eighth floor of the adjoining White Building.

Fourteen neuromedical-neurosurgical beds will move to the 11th floor of the Gray Building. As an important related change eight neuromedical diagnostic rooms have been transferred to Gray 11 from crowded quarters scattered about the hospital. These include five rooms where electroencephalograms (EEG) to record brain waves

Modern nursing stations assure quick response to patients' needs.

Residents Learn New Techniques As They Appear

(Continued from Page 1)

MGH. "While a medical student spends virtually all of his time preparing to become a physician, he does not actually practice medicine. Surgical residents, on the other hand, do practice surgery. They do the same work during their programs that they will be doing afterward."

Dr. Ottinger estimated that in the five years of surgical training, a resident would assist at from 1,000 to 2,000 operations and perform between 500 and 800 as the primary surgeon.

"Our program is built on offering residents mounting responsibility and increasing opportunities to develop technical skills," he said.

"A new resident does even routine surgery only under very close supervision. By the end of his five years, he is capable of carrying out virtually all operative procedures without any supervision. The evolution from one to the other is, of course, a gradual process."

MGH residents – surgical or otherwise – obtain special educational dividends. They see complexities of illness in patients who find their way only to a worldwide referral center.

The resident learns the latest techniques as soon as they develop. During training, the residents work under some of the world's most skilled practitioners. Finally, the surgical resident at the MGH trains for one year longer than national requirements.

"As a result of such factors," said Dr. Charles A. Sanders, MGH General Director, "our senior residents are probably better equipped to treat serious or rare illnesses than if they had practiced for 20 to 30 years as private physicians.

"Our patients profit because they get the best possible mix of young and older physicians. And if any emergency occurs at 3 a.m., the resident is available to carry out lifesaving procedures."

Like all MGH residents, surgical candidates are chosen through the National Internship and Residency Matching Program on the basis of medical school performance, letters of recom-

(Concluded on Page 6)

Initially assisting the primary surgeon, the surgical resident gradually earns increasing responsibility and will perform up to 800 operations before completing the training program.

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are taken. Another three rooms are used for electromyograms (EMG) to record electric impulses from muscles. As a result, testing roughly 1,500 more patients a year will be possible since the present pioneering facilities are too crowded to permit efficient use.

Now situated on two separate floors, the Urology Service will be consolidated on the new or renovated 10th floors of the Gray and White Buildings. The merger of urology patients will permit improved communications among medical-team members working in one area instead of two and will concentrate nursing specialists on the one floor.

The Dermatology Unit will house its patients in the renovated rooms on the eighth floor of the White Building. Instead of the two four-bed areas now used, the remodeled area will have 10 beds with a maximum of two to each room. Air conditioning, good lighting, and quiet will improve this, the only inpatient unit in Massachusetts for the treatment of skin disease. The unit sees the very severely ill dermatology patients.

To achieve these changes, the hospital had to obtain a Certificate of Need from the Commonwealth of Massachusetts.

Burgess P. Standley, Director of Planning, and Carleton N. Goff, Resident Architect, have guided the overall physical plans.

Stephen H. Kauffman, Director of Administrative Services, is coordinating the moves to occupy the new floors. Included has been the temporary move of White Building patients whose floors are being modernized.

Another feature incorporated will include a separate kitchen to provide better food service.

Some Recorded Bulfinch "Firsts"

The first public demonstration of painless surgery made possible by anesthesia was held in the Ether Dome of the Bulfinch Building in 1846.

In 1878, a method was developed for crushing and removing bladder stones in a single operation.

Recognition of the true nature of appendicitis came in 1886 with resultant opening of the abdominal cavity to surgery of various kinds.

In 1896, one of the country's first uses of X rays took place in the Bulfinch Building.

Research in 1925 and 1926 in Mallinckrodt-Ward 4 led to the end of lead poisoning as a major industrial hazard.

In 1929, studies into hyperparathyroidism, one of the commonest endocrine disorders, resulted in successful operation to cure the illness.

Use with M.I.T. of radioactive iodine in thyroid research helped to open the era of nuclear medicine in 1937.

Choosing Residents With Highest Potential

(Concluded from Page 5)

mendation, interviews, and grades achieved on an examination given at the hospital each January to as many as 100 carefully selected people.

Each year the hospital's reputation tends to attract some of the top medical school graduates from all over the country. From that group of 100, 12

The late Dr. Edward D. Churchill, former Chief of General Surgical Services, who devised the present structure of the MGH's Surgical Training Program

are selected annually for general surgical training.

Particular care is exercised in the internship screening because of the "rectangular" structure of the hospital's program. That is, at present all residents are assured that so long as they perform up to the patient-care standards of the hospital they will be allowed to continue in the program until completion.

The late Dr. Edward D. Churchill, MGH Chief of General Surgical Services, proposed the rectangular system in the late 1930s as an alternative to what was known as the "pyramidal" structure.

Under the latter system, a large number of candidates would be introduced into surgical training, but only the top people would be able to stay on. The others, at an early point, would be diffused among other hospitals.

Dr. W. Gerald Austen, present MGH Chief of General Surgical Services, said the philosophy behind the rectangular program was that "first we must obtain very good people and, second, they should not have to try to 'beat out' their friends."

Instead of seeking to impress somebody, he said, their principal concerns should be doing their best for their patients and furthering their education, in that order.

"The 12 residents we accept are young physicians whom we consider to have the greatest potential to become the finest surgeons possible," said Dr. Austen, who is Edward D. Churchill Professor of Surgery at Harvard Medical School.

"If all of the residents elected to remain in general surgery for their entire stay, we would allow it. But we do hope, and it has worked out, that three or four will choose to go into a specialty. That is ideal for our training program."

Opportunities also arise for outstanding residents to engage in research and study within laboratories at the MGH and at Harvard Medical School with which the hospital has maintained a close relationship since its founding.

"The institution functions as a community hospital for perhaps 70 percent of its bed capacity and as a referral hospital for 30 percent," said Dr. Ottinger, an Associate Professor of Surgery at Harvard Medical School. "That is a very realistic apportionment because in their careers surgeons devote most of their time to common problems."

Reflecting in large measure the community hospital aspect of MGH care is its Emergency Ward which receives an average of 250 patient visits a day.

"There the young resident can see and help to treat the standard acute traumas, the gastrointestinal bleeding patient, the hemorrhoids, the acute gall bladder, the appendicitis, and other afflictions," Dr. Austen declared. "That experience alone provides a broad education."

In the MGH's Baker Memorial Hospital and Phillips House, residents have an opportunity to learn from surgeons attending private patients. And on two floors of the White Building, residents engage in a group practice under staff supervision.

"The group practice delivers to a patient the same care that a patient anywhere else in the hospital would receive," Dr. Austen said. "At the same time, the resident has a bigger, more active role in such a setting."

Dr. Austen cited still another MGH quality: the depth of its staff. "In some teaching hospitals," he said, "you will find one or two instructors heading up an entire program. Here, each program offers four, five, or six teachers, all of whom are extremely well-known, or on their way to being well-known.

"The MGH resident, therefore, not only has the benefit of several first-class views but also the assurance that his education will not be interrupted if a teacher becomes ill or goes on vacation."

Like most senior staff members, residents toil long hours. A surgical resident might launch his work day at 6 a.m., calling on patients before the operating schedule begins, and conclude his shift at 6 or 6:30 p.m. Usually every second night he would be at work or "on call" at the hospital.

Although the financial compensation is regarded as reasonable, three quarters of the residents are married, and they wish they could devote more time to their families.

One resident commented that if he confined his activities to furthering his personal education, his training goal would be reached much sooner. But he added:

"That is not what I'm here for. I am a doctor first, responsible for treating patients, and then a student, trying to become an even better doctor."

Although the road is a long one, all of the personal sacrifices somehow seem worthwhile.

Some surgical specialties require a resident to undergo six to seven years of training beyond his M.D.

Northern Hospital Serves Wide Region

(Concluded from Page 8)

answer another. Because of the complexity of their illnesses, neurosurgical patients must be referred elsewhere.

"The staff is small," Dr. Constable said, "but its capabilities nevertheless are amazing. There is always someone ready to learn something new. The hospital's principal orthopedic surgeon, for example, went off for a year to study urology because the institution lacked a urologist."

The hospital and a string of nursing stations along the Labrador coast protect the health of some 50,000 people in an area the size of New England.

The institution and its satellites were founded in the early 1900s by an English doctor, Sir Wilfred Grenfell, to meet the medical needs of isolated pockets of English and French fishermen, as well as the local Indian and Eskimo population.

When Newfoundland and eastern Labrador elected to join Canada as its tenth province in 1949, the government in Ottawa undertook to support and develop what was then known as the Grenfell Mission Hospital in St. Anthony. It later was named in honor of Dr. Charles S. Curtis, Dr. Grenfell's successor as the hospital's Chief of Staff.

The Grenfell Association continues to maintain the nursing stations and also a fleet of three small planes which provide the link with St. Anthony.

Dr. Constable's first trip to the hospital there was proposed by Dr. Elliott V. Miller, an MGH anesthetist. He is on the Board of Directors of the New England Grenfell Association along with several other MGH people.

The others include: Associate MGH General Director Lawrence E. Martin; Drs. Edwin P. Maynard III, Theodore C. Badger, William U. Shipley, and Edward B. D. Neuhauser, and Duncan Neuhauser, Ph.D.

In 1967, Dr. Miller spent six weeks aboard the Grenfell hospital ship "Strathcona III" attending to the general medical needs of residents along the coast of Labrador.

Although the hospital ship is no longer in service, he visits St. Anthony from time to time to carry out administrative duties at Curtis Memorial Hospital and assist in health care.

After hearing Dr. Miller cite the hospital's need for a plastic surgeon, Dr. Constable offered to donate his services.

"After a couple of visits, it became quite obvious that the hospital had many interesting patients who could benefit from plastic surgery," said Dr. Constable, an Assistant Clinical Professor of Surgery at Harvard Medical School, "so I insisted that henceforth I be allowed to bring along an MGH resident each year to help."

He also reasoned that even brief total exposure to plastic surgical patients could be of immense help to a resident who might be pondering a career in that field.

It has turned out that of the seven residents who have accompanied Dr. Constable to Newfoundland, five, including Dr. Hansen, have decided to go into plastic surgery. Of the two remaining, one chose general surgery; the other, cardiac surgery.

Dr. Miller welcomes the services of additional physicians and surgeons at Curtis Memorial, particularly doctors who might be available to fill in for staff personnel as vacation replacements.

During the first few years that Dr. Constable traveled to St. Anthony, he found that night-flying aircraft were guided to landings at the local airstrip by the headlights of trucks. Dog sleds were common in the town but disappeared in a single year with the arrival of snowmobiles.

Members of the hospital staff were almost all nonlocal. They included many Scottish nurses.

"The scene reminded one of the hospital run by Dr. Albert Schweitzer in Africa," said Dr. Constable. "Today, the Curtis hospital boasts many young Newfoundland nurses and medical students. Also the tendency of some doctors there to regard themselves as visitors has shifted. They have settled down to lifetime careers in St. Anthony."

The visit by Drs. Constable and Hansen allowed for some recreation. Hospital staff members frequently invited them to dinner. Dr. Hansen recalled having moose one evening, squid another.

Dr. Constable took advantage of opportunities for long walks in the countryside where the terrain was very deceptive. "You would see bare ground in one place," he said, "and, in another, a tuft of greenery protruding from the snow. The greenery could turn out to be the top of a 12-foot tree buried in the snow."

In evaluating applicants to accompany him to St. Anthony, Dr. Constable insisted that his companion had to be able to play cribbage.

Dr. Hansen claimed he could, then hurried out to buy a "How to . . ." book and practiced with friends. Later in Newfoundland, he turned out to be a formidable adversary for his host.

During a 1975 visit to Newfoundland, Dr. Harvey M. Rosen, (left), an MGH surgical resident, and Dr. Constable grafted skin to an elbow of this little Indian girl to replace a disabling burn scar.

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Delivering Health Care in the Far North

The hospital appeared much like any other modern, efficient, health-care institution. Containing beds for more than 200 patients, the three-story, white, brick structure boasted a competent and dedicated professional staff as well as the latest in medical and surgical equipment.

Outside the hospital the sameness disappeared, and the setting assumed an almost unique quality.

Although the peak of winter had passed, the temperature still hovered between 0° and 5° above, and a mantle of snow drifting to 12 feet covered the area.

A curious mixture of cars, trucks, and snowmobiles edged along the town's main roads.

To obtain treatment at the hospital, patients from points northward traveled by airplane. From the south, a choice was offered: air transportation or a motor trip along a winding, sometimes perilous, unpaved road that extended for 300 miles.

Frequently the length of a patient's hospitalization depended more on the availability of transportation home than on medical factors.

These were the circumstances that greeted two MGH doctors on February 25th of this year when they arrived in the Newfoundland town of St. Anthony, very near the site where the Vikings in 1,000 A.D. purportedly became the first white men to set foot in North America.

For the ninth straight year, Dr. John D. Constable flew to Newfoundland to perform plastic surgery at Curtis Memorial Hospital in St. Anthony. And, as he had done six times before, the MGH surgeon who volunteers his services brought along a surgical resident. The latest honor fell to Dr. Reid H. Hansen, a second-year resident in general surgery at the MGH.

Together during a 16-day stay in St. Anthony, a seacoast town of 5,000 just 30 miles south of Labrador, they performed more than 30 operations. At times Dr. Hansen assisted Dr. Constable. On less complex procedures, Dr. Constable assisted.

In addition to the surgery, the doctors examined and prescribed care for about 70 outpatients.

"We worked exceedingly hard during the brief time we were at the hospital," said Dr. Constable. "Staff members put in extra working hours to accommodate us and our patients, some of whom had waited an entire year for their next appointment."

An advantage of ministering to patients with plastic surgery problems is more leeway to put off treatment. Unlike most other surgical situations, stages of plastic repair which might normally be spaced three or four months apart can just as effectively be scheduled a year apart.

"The operating room staff at Curtis Memorial also is exceedingly efficient," Dr. Constable added. "It can handle as many as nine consecutive general anesthesia patients in the same room with the same anesthetist and still finish in time for a late tea."

Aesthetic plastic surgery did not figure into the plans of the Boston physicians, but, as Dr. Hansen said, "if somebody had a crooked nose because of a cleft palate, we tried to take care of both problems."

Drs. Constable and Hansen performed extensive posttraumatic surgery, such as treating burn-scar contractures or hand-tendon injuries. Sometimes the work involved head or neck reconstruction after cancer surgery. And the MGH team repaired a fair number of congenital birth defects such as extra fingers or toes.

Dr. Hansen recalled a particularly unusual assignment. He operated on a 7-year-old girl to lengthen her thumb.

"She had been born with a thumb that was half the normal length," he remarked. "As a result she was unable to grasp things properly. By employing a small section of bone from one of her ribs, we were able to extend the digit so that she could use it more efficiently."

Only a few gaps exist in the regular medical care offered at Curtis Memorial. Dr. Constable's annual trip from Boston eases one need. Periodic visits by an ear, nose, and throat specialist

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During his latest annual visit to St. Anthony, Newfoundland, to perform plastic surgery, Dr. John D. Constable of the MGH found this vehicle handy for traversing snow-covered terrain.

MGH News

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Helping Stutterers Overcome Language Difficulties

Pediatrics Seeks Closer Departmental Ties

Many chronic adult debilitating diseases, such as high blood pressure, other cardiovascular disorders, obesity, and allergies often begin in infancy or childhood.

Although the fruits of research at the Children's Service of the MGH have improved patient care on several fronts nationally, the service's struggle to get at the root of early medical problems that can become lifetime afflictions may soon accelerate.

"We ought to redouble our efforts to create new knowledge that will help children and adults alike," said Dr. Donald N. Medearis, Jr., who in July became Chief of the Children's Service.

Praising the MGH as a rich intellectual environment that, if not unique, is strikingly unusual in the world, Dr. Medearis said he is giving high priority to establishing an even closer working partnership with other MGH departments in seeking ways to improve health through care, research, and education.

"I see here," he said, "not only an opportunity but indeed also an obligation to interrelate with outstanding internists, surgeons, orthopedists, neurologists, psychiatrists, and people of other specialties to bring the needs of infants and children to their attention.

"At the same time, I intend to bring together regularly pediatricians, nurses, psychologists, social workers, and other professionals to address problems and recommend ways in which we can do a better job of caring for children within the Children's Service."

A graduate of Harvard Medical School and now Charles Wilder Professor of Pediatrics there, Dr. Medearis has returned to the scene of some of his early medical studies. He reminisces about courses in endocrinology and surgery at the MGH as highlights of his medical training after he earned a bachelor's degree in chemistry from the University of Kansas.

From Harvard, Dr. Medearis, a native of Kansas, returned to the Midwest to intern at Barnes Hospital in St. Louis and to pursue two years of training as a pediatric resident at the Children's Hospital in Cincinnati.

This was followed by a return to the Boston area to serve two years as a Research Fellow in Infectious Diseases at the Children's Hospital Medical Center.

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By drawing a line or letter for each syllable or word spoken, stutterers frequently learn to speak more slowly and correctly.

Several months ago, a 27-year-old MGH patient who had stuttered most of his life volunteered to participate in a public demonstration of ways to treat the disorder.

Standing before 300 participants at a regional conference of the American Speech and Hearing Association in Boston, the young patient whom we will call Tim was interviewed by a speech pathologist.

The conversation was intended to acquaint the assemblage with Tim's particular speech behaviors, and then the lecturer would demonstrate the treatment techniques.

The interview went on for 10 minutes, 20, then 30. After 90 minutes, the speech pathologist gave up. Although Tim was standing in front of a large audience and conversing with someone he had never met before, he never stuttered – not even once.

"We knew that he had made remarkable strides since he first came to the MGH for treatment in 1974," said Miss Julie A. Wheelden, Director of the hospital's Speech Pathology Unit, "but we were as surprised as everyone else by his remarkable speaking performance."

Tim's speech problems became evident when he was between 3 and 4 years old. His condition worsened as he grew older. When initially evaluated at age 24 by Miss Wheelden's unit, he stuttered severely. Only a few words cleared his mouth before he encountered involuntary blocks, his voice sticking on a particular word or syllable. He grimaced and thrust his head up or to one side as he struggled to articulate.

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EDITORIALS:

A Historic Transplantation

The June-August issue of the *MGH News* described an impending move of the hospital's Bulfinch medical wards. In July the actual event took place. Over a few hours the 16 to 19-bed wards were transplanted from their 156-year home to the new floors of two-bed rooms in the Bigelow Tower of the Gray Building.

The transplantation went with dispatch and precision. So quickly did the move occur that patients marveled that one moment they were in large, communal, early 19th century settings and the next in an area that seemed almost beyond their imagination.

To make the transplantation proceed without hitch and without problem for the patient required years of planning down to the tiniest detail. Professionals and nonprofessionals of every conceivable occupation united in both the planning and the execution. Guarding even against the possibility of an elevator breakdown, a repairman stood by in case of a malfunction. The teamwork of hundreds of dedicated people made the historic project a complete success.

Except for psychiatric patients and a metabolic research unit, the Bulfinch Building now has no patient beds. As long as there are patients who were once cared for in the Bulfinch wards and health care providers who worked there, the memories of the previous era will linger.

Nathan Bill Talbot

After 17 years Nathan Bill Talbot has retired as head of the MGH Children's Service. During these 17 years, he has stressed the social as well as the physical well-being of the little patients placed in the care of the hospital's Burnham Division for Children. In a period when medicine has been criticized for sometimes becoming so absorbed in disease that it cannot see the patient, the Children's Service has never lost sight of the child as a person or of the environment which shapes him.

Visitors to the Burnham Building have witnessed one of the more visible manifestations of this philosophy: the cuddling of infants and the loving attention devoted to older children. While this attitude has beamed credit on the entire pediatric team, Dr. Talbot has been its guiding hand. Now that hand will guide the tiller of his sailing boat and cradle the camera which has won him much acclaim.

Group Interaction Aids Stutterers to Build Self-Confidence

(Continued from Page 1)

"He was very withdrawn," said Miss Wheelden, who holds a Master of Education degree in Speech Pathology. "He couldn't communicate or maintain eye contact with the clinician. Today, at group therapy sessions, he is a dominant member who frequently assumes the role of group leader."

Of the many modes of treatment for stuttering, syllable-timed speech helped Tim the most. As he spoke, he learned to place equal stress on each syllable. Gradually he lost the tendency most stutterers have of speaking too fast. His facial muscles no longer tensed.

As the patient's fluency increased, his participation in group therapy focused more specifically on situational fears and alternate ways of approaching previously difficult circumstances.

Interaction with other patients who could offer both encouragement and support produced greater self-confidence fostering carryover to outside situations. These ranged from ordering a meal in a restaurant to making phone calls to addressing important people.

Once virtually disabled socially by his impairment, Tim now is married and holds a responsible position in business.

Stuttering, which affects two million Americans, has been described throughout the recorded history of mankind.

The Old Testament hints that Moses may have had a speech impediment and that, because of it, relied upon his brother Aaron to convey God's command to the Israelites to head for the Promised Land. According to the Holy Scripture, Moses had complained of being slow of speech and tongue.

Demosthenes, the famous Greek orator who lived in the fourth century, B.C., reportedly cured himself of severe stuttering by going to the seashore, filling his mouth with pebbles, and trying to outshout the roar of the surf.

Despite 50 years of intensive research, the medical profession con-

Photographs: Pages 1, 3, 6 (lower), 7, 8, Myron Daniels; p. 4, Joel Salhanick; pps. 5, 6 (upper), MGH Photo Lab.

tinues to debate the causes of stuttering and, more important, the most effective treatment.

The impairment, found in virtually all cultures and among many more males than females, has been attributed by some researchers to organic factors, by others to anxieties or phobias, and by still others to extreme or premature parental pressures.

Regarding the latter, Miss Wheelden commented that most children go through a dysfluent stage during language development because ability to comprehend language exceeds expressive ability.

"Parents who don't understand the normal process of language development may insist on precise speech from their children before they are capable," she said. "Hence, a child may early in life believe himself to be a disabled speaker."

Frequently then, when a child is brought to the MGH Speech Pathology Unit for treatment as a stutterer, the counseling is directed at the parents rather than the child.

Studies have shown that at least 80 percent of all stutterers become fluent by the time they reach 18 years of age. Why is unclear. Release from parental control is offered as one theory.

At a recent Psychosomatic Conference of the MGH Psychiatric Service, Dr. Gregory L. LaVigne, a second-year resident in psychiatry, said that people whose stuttering continues into adulthood usually are beset by a chronic fear of speaking in public.

"The individual expects to stutter, so he avoids certain situations in which he knows his anxiety will increase," Dr. LaVigne remarked. "Who the listener is and how he responds is sometimes the most critical factor in determining whether a stutterer will have trouble speaking."

Miss Julie A. Wheelden, Director of the MGH Speech Pathology Unit, employs a technique called delayed auditory feedback to treat a stutterer. The patient hears his own words less than a second after saying them and can move quickly to correct any speech impediments.

In most cases a stutterer is more often fluent than dysfluent when speaking. In addition when he is reading, singing, or speaking in unison with a group of people his stuttering – or stammering – decreases. Sometimes if he is caught off guard or by surprise, his speech will be perfectly normal.

Blocking – inability to vocalize a word or sound – varies greatly among stutterers.

"One person may always block on the first syllable of the word 'mother' but on no other word starting with 'm,' " said Dr. LaVigne.

"Some will block on the first syllable of words beginning with 'f' but be totally fluent with words beginning with 'ph' which is essentially the same sound. The visual picture of the word in the stutterer's mind seems to be important."

Some people, however, respond to situations by stuttering without focusing on specific sounds.

Interestingly, some totally fluent people have joined the MGH speech pathology groups for treatment as stutterers. They may have overcome dysfluency at one time but not the fear that impairment might recur at any time.

At the Psychosomatic Conference, Dr. Theo C. Manschreck, an MGH psychiatrist and member of the hospital's Psychiatric Consultation Service, told of research he is conducting to evaluate muscle biofeedback as a means of treating stuttering.

"The grimacing that often accompanies stuttering is an indication of the difficulty being experienced," he said. "Using an electromyograph to measure muscle spasm or tension, investigators have noted that 'spikes' representing muscle tension tend to increase when a person stutters and to decrease when he does not.

"Pilot studies at the MGH have shown that if a patient is trained to relax those muscles affected most by stuttering-induced tension, the speaking pattern of the patient frequently improves."

Another form of feedback – delayed auditory feedback – is sometimes used by the Speech Pathology Unit to treat stuttering. Wearing earphones through which he hears his own words only a fraction of a second after saying them, the stutterer becomes fluent by adjusting the rate and rhythm of his speech.

Still another approach employed here is "pencil facilitation." Its pur-

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At a group meeting led by Mrs. Maureen Tardelli, Assistant Director of the Speech Pathology Unit, persons with speech problems listen attentively as a group member explains how he overcame a speaking impairment. Such interaction provides valuable support for all.

New Pediatrics Chief Sees Poverty as Key Health Care Enemy

(Concluded from Page 1)

For the nearly 20 years since his training, Dr. Medearis has made his contributions to pediatrics from such positions as:

Cochairman, Department of Pediatrics, Case Western Reserve University; Director, Department of Pediatrics, Cleveland Metropolitan General Hospital; Dean, University of Pittsburgh School of Medicine; Medical Director, Children's Hospital of Pittsburgh; and Associate Professor of Pediatrics and Microbiology, Johns Hopkins University School of Medicine.

At Johns Hopkins, he was a Joseph P. Kennedy, Jr., Foundation Senior Research Scholar in Mental Retardation.

Like his retired predecessor as head of pediatrics at the MGH, Dr. Nathan B. Talbot, Dr. Medearis believes that the social well-being of a child is a vital component of his overall physical fitness.

"To my mind, the diseases and disorders associated with poverty constitute the biggest set of problems facing pediatricians today," he said.

"If a hospital admits a child with a medical problem whose roots are planted in poverty and deprivation, the illness may well respond to treatment, but once the patient returns to his familiar environment chances increase that he will redevelop the same, or a related, set of difficulties.

"Such disordered states of development must be corrected. To do this, we must constructively interrelate with and support those people who can more positively and directly address the issues of poverty, housing, education, and employment."

Asked what he considers the single most serious disease challenging pediatricians, Dr. Medearis said: "Mental retardation. Retardation, or abnormal development, is our greatest concern."

For many years, Dr. Medearis has carried on research in this field, focusing on the threat of cytomegalovirus (CMV) to newborns.

"When the infection is transmitted by a mother to her unborn child during pregnancy," he said, "a part of that child's brain may be destroyed, leaving the infant either mentally retarded or deaf."

Studies have shown that CMV infects about 1 of every 100 newborns in this country. Of that group, 10 percent suffer brain damage ranging from severe to subtle degrees of mental retardation or hearing loss.

During a visit to the MGH Newborn Intensive Care Unit, Dr. Donald N. Medearis, Jr., new Chief of the Children's Service, looked in on this infant being held by Mrs. Bernadette Reilly-Smorawski, RN.

In his recent laboratory studies, Dr. Medearis has been studying mouse CMV infection from the standpoint of immunizing animals and protecting their future offspring. "By developing such a model for immunization," he said, "we hope to gain information applicable to the human condition."

The virus, a member of the herpes group, has also been associated with forms of mononucleosis, hepatitis, arthritis, a decrease in blood platelets (needed for clotting), and pneumonia. In addition, CMV has been shown in MGH studies to increase the susceptibility of transplant patients to overwhelming bacterial pneumonia.

Dr. Medearis subscribes wholeheartedly to the philosophy that a child with an acute or chronic illness needs emotional support as well as expert physical attention.

At the MGH this philosophy has for years been put into practice by encouraging parents to visit with their hospitalized youngsters at any time of the day or night on any of the pediatric floors.

The invitation extends to the pediatric intensive care units. In the Newborn Intensive Care Unit the staff encourages parents and nurses to cuddle in their laps even tiny infants attached to tubes.

"Tender loving care is much more than an expression of affection," said Dr. Medearis. "It is a way of supporting the optimal development of a child in a time of stress.

"By sustaining family relationships that are so important to young patients, parents help immeasurably in speeding a return to good health."

Pediatric residency training programs at teaching hospitals may soon be revamped to turn out greater numbers of generalists, physicians dedicated to caring for the overall health needs of children rather than to being specialists.

Dr. Medearis views facilities such as the MGH-Bunker Hill Health Center in Charlestown, the MGH-Chelsea Health Center, and the MGH Pediatric Ambulatory Care Division as excellent training grounds for prospective generalists.

He also said the American Board of Pediatrics and related groups in the profession would like to see the presently required residency period of two years of formal general pediatrics extended to three before any specialized training commences. Dr. Medearis favors such a proposal.

"The excellence of the MGH Children's Service has been demonstrated time and time again," he said. "Although small, this department has contributed much to pediatrics on both the national and international levels. The record is something to be proud of and grateful for as a base on which to build."

Dr. Talbot Combats Parental Neglect of Children

At the turn of the century, because of one malady or another, nearly 40 percent of America's children failed to survive beyond adolescence.

Today, after great advances in the physical health sciences, 99 out of every 100 children in the United States attain adulthood.

For many families, however, new ways to assure longer life, accompanied by technological developments geared to lighten daily toil, have failed to assure a bright future for the nation's young.

"The natural support system for children, which is the family and the community, has been seriously upset by the technology and massive urbanization of modern life," explained Dr. Nathan B. Talbot, who retired this summer after 17 years as head of the MGH Children's Service.

"We find modern families moving frequently, living in a sea of strangers, and, in many cases, neglecting their children who are the nation's number one natural asset."

The neglect ranges from lack of attention, to abuse, to outright rejection.

"In Massachusetts alone," said Dr. Talbot, "there are 20,000 children under the age of 5 who spend entire days without adult supervision."

He said children of all ages need a sense of belonging, of being wanted, and of being guided, as well as a sense of values.

One of the prices paid for neglect – juvenile delinquency – accounts for approximately 40 percent of the nation's $100 billion annual loss from crimes of all types.

"Being poisoned psychologically by abuse, neglect, and rejection is just as lethal as being deprived of air or water," Dr. Talbot warned.

In a book he authored, *Raising Children in Modern America: What Parents and Society Should Be Doing for Their Children,* Dr. Talbot wrote:

"As a society we cannot justify indifference to the emotional damage inflicted on children who are neither needed, wanted, nor valued any more than we can tolerate failure to cover their physical needs.

"The only way we can meet our obligation is by making sure that every child born into our society is wanted by parents who can and will take care of him. And when they cannot or are unwilling to, society must not hesitate to get to work early and take such measures as may be necessary to insure that the child will be under the care of an interested, responsible person."

Dr. Nathan B. Talbot

The book, published last year by Little, Brown and Company, is based on an interfaculty seminar, held at Harvard University, which studied various aspects of the condition of children in America.

Dr. Talbot, Charles Wilder Professor of Pediatrics, Emeritus, at Harvard Medical School, served as chairman of the seminar.

Retirement from an active medical career that spanned 41 years has enabled Dr. Talbot to devote increased energies to a role as chairman of a recently formed "Action for Children-At-Risk Task Force."

Comprised of all the major children and family service agencies in Greater Boston, the task force is seeking ways to control the pandemic of social and behavioral maladies which beset children. And by making sure that youngsters are provided adequately with essential psychosocial as well as material help from birth onward, the group feels such maladies can be blocked before they start.

Dr. Talbot's preoccupation with the social as well as physical development of children stemmed from studies he conducted many years ago on basal metabolism – the minimum energy needed to maintain vital functions in an organism at complete rest.

Working in Ward 4, the metabolic research ward at the MGH, Dr. Talbot studied children suffering from a condition called progeria, or premature aging.

"I recall one very bright little boy, about 8, who came in looking like a wizened old man," said the Harvard-trained pediatrician.

"Though he ate voraciously and digested his food normally, he remained very thin and short for his age. The reason was that he was congenitally unable to conserve and store calories for growth; he was able only to use them as fuel and convert them into heat."

From this work came an awareness of the impact which insufficient energy balance can have upon the growth of children. In turn this provided a clue as to why some seemingly basically normal children who are chronically underweight for their height may be abnormally short for their age.

"We found that if you could get more calories into them by one way or another, many of them would start to grow," Dr. Talbot said. "We would first see this in their bodies' retention of nitrogen, a basic building block for bones, muscles, and so forth."

One 8-year-old girl, however, who was a typical, basically healthy, hypocaloric (consuming too few calories) dwarf failed to show any improvement in later visits to the hospital.

In searching for the reason, Dr. Talbot discovered that she had been neglected by her natural mother and was being reared in a foster home. Although she now had love, she suffered from a constant fear of being moved again.

The foster mother sought to adopt her, but a judge refused permission, saying the child was not doing well.

With the aid of the late Dr. Erich Lindemann, then Chief of Psychiatry at the MGH, Dr. Talbot persuaded the court that the girl was suffering from lack of appetite (anorexia) because of her dread of having to leave her foster home.

"The judge allowed the adoption by the foster mother," Dr. Talbot recalled. "and almost immediately the child began to gain weight and grow. She exhibited one of the fastest rates of catch-up growth that I've ever seen."

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Dr. Talbot helped to establish the MGH-Bunker Hill Health Center in Charlestown, Mass., in 1968. Through community care, physicians obtain valuable insights into family health problems.

Pediatric Lectures Reflect Talbot Philosophy

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That incident many years ago emphasized the importance of regarding children as both physical and social beings.

Convinced that community care offered physicians excellent exposure to many facets of modern-day health problems, Dr. Talbot and Mr. Henry J. Murphy, then MGH Associate General Director, were instrumental in persuading the hospital to establish the Bunker Hill Health Center in Boston's Charlestown District in 1968. Three years later, the MGH-Chelsea Health Center was opened.

In 1971, since there was little in the literature defining the anatomy and physiology of social behavior, Dr. Talbot teamed with Dr. Leon Eisenberg, then MGH Chief of Psychiatry, and Jerome Kagan, Ph.D., Harvard psychologist, to coauthor a book called *Behavioral Science in Pediatric Medicine*.

Since September 1974, weekly MGH Pediatric Grand Rounds (medical meetings) have been known as "Total Patient-Care Grand Rounds," reflecting the philosophy of Dr. Talbot that the patient must be considered in terms of both medical and social needs.

A revised format that accompanied the new title produced a striking increase in attendance with physicians, nurses, and other health care personnel coming from a wide area to attend the sessions.

"The modern pediatrician should know what makes people tick, physically and socially," said Dr. Talbot. "He has to be a good orchestra conductor, bringing together in a symphonic manner whatever is needed to improve the quality of his young patient's life."

An author of three books and 117 scientific papers, a widely respected teacher and administrator, a member of numerous medical organizations, Dr. Talbot built a career closely paralleling that of his late father, Dr. Fritz B. Talbot, first Chief of the MGH Children's Service.

Even in choosing an avocation, both turned to art. The elder Dr. Talbot was an accomplished painter. Many of his works are on public display, including two in the Boston Museum of Fine Arts, one at Harvard's Fogg Art Museum, and two at the MGH.

His son is a skilled photographer whose work has been acclaimed at many exhibitions.

Researchers Hunt Drug to Aid Speech

(Concluded from Page 3)

pose, like "syllable-timed speech," is to establish a modified speaking pattern by coordinating speaking and writing. As the patient speaks, he pencils a line or a letter for each syllable or word. The simple movement of a finger or mental image of such pacing might later substitute for the actual penciling and then produce the desired fluency.

At present, drugs rarely enter the treatment picture, but studies are under way to determine whether medication can offer hope to the stutterer.

More than a dozen stutterers at the MGH have taken haloperidol, a drug used successfully in treating certain neurological disorders.

Given in a double-blind, control study under the supervision of Dr. Peter B. Rosenberger in the MGH Language Clinic, the drug benefited a number of patients with serious speech defects.

Other patients, however, found haloperidol too unpleasant and discontinued it. They complained that the medication made them feel shaky, drowsy, irritable, or just "out of it."

It is said that there are as many theories about stuttering as there are people treating the condition. In Miss Wheelden's view, "Although the etiology [cause] of stuttering is unclear, the condition is often a learned behavior which along the way has been reinforced and maintained."

Through group and/or individual treatment in the Speech Pathology Unit, she and her colleagues are striving to undo what the patient has learned while at the same time restoring in him or her a sense of well-being and self-confidence.

Using an electromyographic (EMG) dual processor, Dr. Theo C. Manschreck, MGH psychiatrist, and Miss Madeline Kalotkin, Research Assistant, measure tension in the jaw muscles of a young stutterer.

Care of the Deaf Requires Special Training

(Concluded from Page 8)

up to now this has been an unserved population. From the outset any project to treat this group will be faced with a very heavy caseload.

"Also we will be working with a population beset by many special problems that begin early in life and affect not only the patient but also the entire family."

Professionals such as psychiatrists, psychologists, social workers, and therapists must be specially trained to care for the deaf.

"The size of mental health staffs trained to attend the deaf is currently very small," said Dr. Gerber. "And we can't expect such people to just pop up. We must develop academic and clinical programs that will provide the qualifications they must have."

One of the most important tasks faced by such a staff is counseling parents at the time their child's deafness is diagnosed. Parents struggle painfully with a whole host of feelings, particularly anxiety over how they will be able to communicate with their youngster.

Some parents overridden by guilt may overprotect their child while others, filled with frustration and rage, may withdraw from their offspring.

A child of normal hearing reaches school age with anywhere from 5,000 to 25,000 words in his usable vocabulary. Sign language learned by a deaf child at an early age partially corrects this communications deprivation, giving him a mode of expressing his thoughts and feelings. After years of arduous schooling, he can develop some oral skills, although most deaf people still depend on sign language for full communication.

Dr. Gerber said a number of studies have shown that on scales that measure psychosocial adjustment, school performance, and language competence deaf children of deaf parents routinely do better than deaf children of hearing parents.

"This is so," he said, "because deaf parents generally are less surprised at having a child with a hearing loss and thus exhibit fewer negative reactions to the diagnosis.

"Also, since sign language has become a natural part of their own lives, deaf parents begin at the very outset to communicate with their child in this way.

"The deaf youngster of hearing parents may reach school age capable of some gestural communications that his parents understand and be able to lipread some very basic words. Generally, however, he has very few language skills."

Ninety percent of deaf children have parents with normal hearing.

Fears have been expressed that sign language is a stigma, not only branding a child as a handicapped person but also making it difficult for him to later become proficient in lip reading and speech.

Research, however, has demonstrated that even the more skilled and highly verbal deaf person is unable to pick up more than 30 or 40 percent of what is spoken to him. The chance of his assimilating completely into the hearing world is minute.

Psychological studies into problems of the deaf have been conducted for the past 40 to 50 years, but only in recent years, Dr. Gerber said, have efforts been made to standardize tests for the deaf population.

"All too often they have been based on standards appropriate to people of normal hearing," he said. "The tests failed to take into account major differences in language skills, cultural adjustments, and environmental factors.

"In the past, just following instructions for tests required some knowledge of language and thus put many deaf people at a disadvantage."

Development of techniques to measure the hearing of children at a very early age is making possible important new studies concerning the deaf.

A decade ago most audiologists could not fully evaluate a child's hearing until he reached 3 or 4 years of age. Today, specialists can obtain valid results at 3 or 4 months of age.

Earlier diagnosis of deafness opens the door to much needed, long-term studies of such factors as personality development, the effect of early language training, and the complications of coping with deafness when other handicaps coexist.

Technology is providing new ways to help the deaf. Greater efforts are being exerted, for example, to extend to the deaf the benefits of certain forms of communication.

President Carter's administration has called for wider use of a device which attaches to a television set and permits the deaf to follow a TV program by reading captions. The National Bureau of Standards developed the special attachment.

Closer links with the deaf also are possible through establishment of teleprinter channels to police departments, hospitals, and other vital public service agencies. Severely restricted in the use of telephones, people unable to hear can realize full, two-way contact by means of teleprinters.

Dr. Bernard M. Gerber, MGH psychiatrist, right, converses in sign language with Tjoan Tan, an adjustment counselor at the Comprehensive Evaluation and Training Center. Tan is deaf.

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Deafness Can Sometimes Be Misinterpreted

A teen-aged girl was taken to a clinic for examination after tantrum-like outbursts. While awaiting the doctor, she calmed down and tried to write an explanation of her actions.

The words were jotted down slowly, seemingly in disjointed, almost rambling fashion. They appeared to make little sense. Coupled with her earlier tempestuousness, the bizarre-looking words could easily have led to a diagnosis of psychotic behavior.

Actually, the girl was deaf. Presented in American Sign Language, the words she wrote would have made perfect sense. An extended psychiatric evaluation of her condition found her to be normal.

"American Sign Language differs from English in many ways," said Dr. Bernard M. Gerber, an MGH psychiatrist recently appointed Director of Mental Health Services for the Deaf in the Massachusetts Department of Mental Health. "The grammar and syntax are dissimilar. Sign language has a smaller vocabulary and uses many idioms. To a large degree it also relies on facial expressions and body movements.

"Because it is different from English, signs converted into written words may appear quite strange. Such writing by a patient is often interpreted as evidence of a thought disorder when, in fact, it is not."

Studies of deaf children have shown that because of their handicap they frequently lag behind their hearing counterparts in emotional maturity. They seem unable to tolerate as much frustration or adapt as well socially. Their awareness of the feelings and needs of others lessens.

"Misdiagnoses in deaf children usually occur prior to a formal recognition of their deafness," said Dr. Gerber, addressing an MGH Grand Rounds in Psychiatry at the nearby Erich Lindemann Mental Health Center.

"The poorly responsive, distant-appearing behavior of a young child who seems isolated from aspects of his environment might resemble childhood schizophrenia or mental retardation, or reflect a stubborn child. Often this is before anybody thinks of doing audiological testing on the child.

"Anytime you have a language delay or unresponsive kind of behavior in a young child, an audiological examination is crucial."

A survey sponsored by the United States Department of Health, Education and Welfare found that 13.4 million Americans suffer from impairment of hearing. Of this number, 1.8 million are totally deaf. More than 168,000 of them were born deaf. Another 242,000 lost their hearing before the age of 19.

Despite the figures, attention to the mental health of deaf people is seriously lacking, Dr. Gerber told his colleagues. The first program of any real scope began in New York in the early 1950s. However, that project and others that followed have cared for fewer than two percent of the deaf population adjudged to be in need of mental health treatment.

Massachusetts is moving to make amends. Earlier this year a psychologist and a social worker began a pilot project to assess and meet the mental health needs of deaf patients. The team also provides consultation to schools.

In addition, plans are being drafted to establish a center for emotionally disturbed deaf youngsters. Funding for the various projects comes from the Massachusetts Department of Mental Health and the Massachusetts Rehabilitation Commission.

Residents of the state who were born deaf or lost their hearing in childhood total 10,000 to 12,000. Of this group, 1,000 to 3,000 are believed to require mental health assistance.

"The figure may seem low," Dr. Gerber declared, "but remember that

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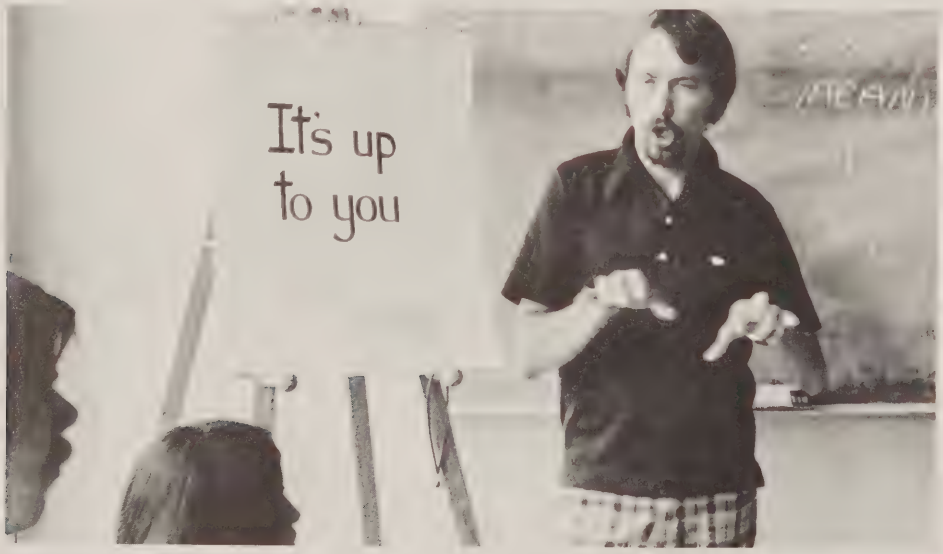

William Huston instructs deaf persons in use of sign language at the Comprehensive Evaluation and Training Center in Cambridge, Mass. Facial expressions are an integral part of the language.

MGH News

Vol. 36 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1977

Mobile Unit Offers Over-the-Road Intensive Care

An automobile veered out of control on a New Hampshire highway, overturned, and hurled a 15-year-old passenger against a tree, crushing her chest.

At a local hospital, examination also revealed excessive fluid in her lungs (pulmonary edema), a critical deficiency of oxygen in her blood (hypoxemia), and serious heart complications.

Despite the efforts of an orthopedic specialist and a second surgeon, and of a cardiologist and an anesthesiologist, the condition of the girl, whom we will call Elaine, deteriorated rapidly. She was at grave risk of dying.

After 24 hours passed and the patient had failed to respond to supportive measures, including use of a respirator to pump oxygen directly into her windpipe (trachea), the hospital staff telephoned the MGH Respiratory Intensive Care Unit (RICU).

Dr. Michael A. Rie, an MGH anesthesiologist and pulmonary specialist, listened to the medical details, agreed to transfer Elaine to the RICU, and signaled the MGH's mobile intensive care team into action.

Equipment reserved for such emergencies was loaded aboard an unusually outfitted ambulance. Ninety minutes later, the van carrying Dr. Rie, a respiratory therapist, and a specially trained nurse pulled up at the New Hampshire hospital.

A series of procedures during the next two hours assisted Elaine's heart and lungs and raised her blood pressure and blood oxygen content from very low levels. Her condition stabilized, she was moved to the waiting

(Continued on Page 4)

Improving Skills to Diagnose Skin Ailments

Everyone who examined the middle-aged man in the MGH Skin Tumor Clinic felt that the large ulcerated lesion on his lower lip was cancerous. If confirmed as a squamous cell carcinoma, disfiguring radical surgery followed by plastic surgery would be necessitated.

To verify the tentative diagnosis, the surgeon performed a biopsy. The report that came from the laboratory reversed the picture.

The laboratory results ruled out a tumor and labeled the lesion instead as a peculiar response to a herpes virus. A diabetic condition had caused the unusual appearance of the tissue.

Because of the laboratory findings, a surgeon merely removed the lesion itself to clear up the patient's problem.

The guiding hand to proper care of the patient belonged to a dermatopathologist – a relatively unpublicized breed of medical specialist.

The title signifies a bridging of two disciplines: dermatology, the science of the skin, and pathology, the scientific study and analysis of diseases in general.

Although dermatopathology is believed to have originated about a century ago in Europe, most of the interest drawn by the subspecialty has been generated within the past 10 years.

The reasons are twofold:

• Development of a tremendous call for the review of skin slides to diagnose disorders. At the MGH alone, pathologists study approximately 7,000 skin biopsies each year. That figure represents about 25 percent of the hospital's surgical patients.

(Continued on Page 2)

The spaciousness of the intensive care van allows the medical team to surround the patient and perform any necessary procedures.

To our readers . . .

Are we producing the kind of publication you want to read?

In the centerfold of this issue of the *MGH News* is a questionnaire requiring only a few minutes to complete.

Your response will help us to serve you better.

MGH *News*

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EDITORIAL:

The Brain and Pain

Always assigned an almost mystical role by many, the heart has lately lost some of its romance: First, open-heart surgery and, more recently, heart transplants have somewhat demystified that organ. Now the public looks at the heart more nearly for what it is: a magnificently designed, ingenious pump – not the seat of courage or the fountainhead of life.

That leaves the human brain as the sole organ generally regarded with a special aura. The brain is the center of all our senses – and much more. This one organ regulates our entire body. The brain stores our knowledge and our memories of the past and allows us to think and to communicate our thoughts.

In short, our multipurposed brains, combined with our dexterity with tools, make us humans. Add to these dimensions a nonscientific role commonly attributed to this organ: the seat of the "spirit."

Man's knowledge of the brain is very small indeed. How great a role does the mind have in physical illness? Is man gifted with extrasensory perception? Just how does the brain control pain? A tiny sample of the questions baffling science, these.

One of the branches of medicine struggling with some of the questions is neurosurgery. And one of those brilliant pioneers privileged to look for clues that will one day offer man surcease from neurologic problems is Dr. William H. Sweet. In the 16 years before his retirement in July as Chief of Neurosurgical Services at the MGH, Dr. Sweet was intimately involved in several advances in the treatment of such problems.

His fertile mind and his concern for the physical suffering of man have already led him to devise means to help relieve pain. In his retirement from his administrative duties, Dr. Sweet will concentrate on caring for patients with pain that has resisted treatment and on research into the mechanisms and relief of that pain. We wish him success.

Skin Disease Often Can Be Diagnosed By Immunofluorescence

(Continued from Page 1)

• The mounting complexity of skin diseases. Treatments prescribed for cancer patients, for example, may lead to varied skin responses.

Often, therefore, the interpretation of a skin disorder requires an intimate knowledge of the structure, functions, diseases, and treatment of the skin.

"The skin is an organ in which one can ideally study disease processes," said Dr. Martin C. Mihm, Jr., Director of the MGH Dermatopathology Unit and Associate Professor of Pathology at Harvard Medical School.

"The pathology of inflammation and neoplasia [formation of growths] can be viewed right under your eyes and then you can actually document what has gone on."

An important assist in diagnosing skin problems is a technique called immunofluorescence. It involves staining a biopsy with a variety of antibodies tagged with a substance called fluorescein.

Put under a microscope adapted to shine an ultraviolet light, the fluorescein activates, taking on a color, and permits the viewer to see where the antibodies are situated. A number of conditions such as lupus erythematosus (a connective tissue disease) can be diagnosed by specific patterns formed by the antibodies.

In addition to diagnosing disease, the dermatopathologist plays a vital role in research.

Photographs: Pages 1, 4 (lower), Joel Salhanick; pp. 3, 6, 7, Myron Daniels; p. 4 (upper), courtesy of Dr. Michael A. Rie; p. 5, Fabian Bachrach; p. 8, Commercial Convention Photographers, Atlanta, Ga.

Letter to the Editor

Dear Editor:

Ever since I received the *MGH News* (May issue), I've been meaning to write and tell you how much I always enjoy the *News* and, most especially, how much I enjoyed the article concerning the Treadwell Library.

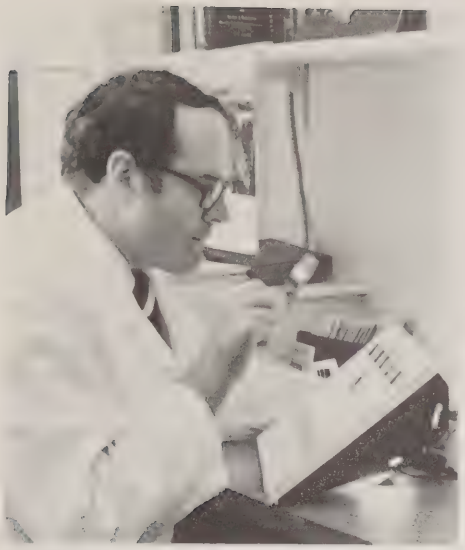
It is very gratifying to know that a program for which my staff and I laid the foundation as far back as February 1968 is so successful.

At that time our first TWX terminal was installed as part of an experiment in cooperation with the New England Regional Medical Library Services based at the Countway Library of Medicine at the Harvard Medical School.

When the Medline Search capability became a reality in 1972, I immediately investigated it and was accepted at the National Library of Medicine in Bethesda, Maryland, to attend the three-week course in search strategy in August-September, 1972.

Before I retired on September 30, 1973, a new terminal had been ordered which would decrease the noise level as well as increase the speed of transmitting and receiving. I understand that it was very successful. No doubt it has been replaced by a better one since improvements are continually being made.

Genevieve Cole Wirshing
Former Treadwell Librarian
Albany, New York



Dr. Martin C. Mihm, Jr., Director of the MGH Dermatopathology Unit, examines an array of skin slides.

In Dr. Mihm's opinion, probably the most unusual aspect of dermatopathology is the ability to carry out research in collaboration with other disciplines. For example, he has been involved with other dermatologists, pathologists, surgeons, and oncologists (tumor specialists) in a multi-university, multidisciplinary study of malignant melanoma (a form of skin cancer), serving as Chairman of the Pathology Committee.

In this effort, an attempt to understand human tumors is a basic goal with the overall purpose of increased survival from these growths.

"We have made important inroads in studying malignant melanoma," said Dr. Mihm. "By reviewing thousands of slides, we have gained insights into why malignant melanoma behaves differently in people and what clues to look for to render a prognosis.

"In studies of human vasculitis [inflammation of vessels within the skin] since formation of the Dermatopathology Unit, we have discovered two patterns of vasculitis heretofore unrecognized, all because we were able to observe patients and take biopsies at different times during the course of their disease. Drs. Nicholas Soter and K. Frank Austen collaborated in this effort.

"We also have helped to clarify the presence of basophils [rare, white blood cells] in human, delayed hypersensitivity reactions, such as poison ivy. These studies were carried out in collaboration with Dr. Harold F. Dvorak" (*MGH News,* December 1975).

Dermatopathology was practiced at the MGH for more than a decade before the unit was formally established in 1973 under the auspices of Dr. Thomas B. Fitzpatrick, Chief of Dermatology, and Dr. Benjamin Castleman, then Chief of Pathology.

In that year, the American Boards of Dermatology and Pathology also designated a subcommittee to administer examinations in the subspecialty and to set up residency training programs in the United States.

One of nine such training centers approved to date is located at the MGH. Directed by Dr. Mihm, who is board-certified in dermatology, pathology, and dermatopathology, the MGH course was among the first to receive full accreditation.

Another board-certified dermatopathologist, Dr. Eugene J. Mark, joined Dr. Mihm's staff a year ago. They are assisted by Dr. A. Jane Lingeman, a board-certified pathologist, and Miss Eleanor Cummings, administrative secretary.

Although the American Medical Association recommends for qualified physicians a one-year program in dermatopathology, the MGH offers an option of a one- or two-year course. The second year is geared toward research.

At present, the Dermatopathology Unit has two residents and one Fellow in training. A resident in dermatology is also rotating through the unit.

"When the program began earlier this year, we could accommodate only two residents in all," Dr. Mihm said, "and we received 88 applications for those two positions. All but one of the applicants were either board-eligible or board-certified dermatologists or pathologists."

Although the first graduation is not scheduled until next June, one young doctor has already completed a one-year MGH program.

Dr. David McLean trained as a Special Fellow, financed by the Canadian Government. Presently, he is Chief of the Tumor Clinic at the Vancouver General Hospital in Vancouver, B.C.

"I receive at least a half dozen telephone calls a month from various parts of the country asking when my residents will be available to accept appointments," Dr. Mihm declared. "That's how great the need is for this subspecialty."

A group of young doctors participating in the hospital's dermatopathology program listens attentively as Dr. Mihm illustrates a point.

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Thank you for your time and assistance.

Hunting the Key to the Secrets of the Mind

"In the entire cosmos the greatest mystery of which man is aware is the mystery of the mind of man himself. But in the next decade or two lies a tremendous increase in knowledge as to how the human brain works in health and disease."

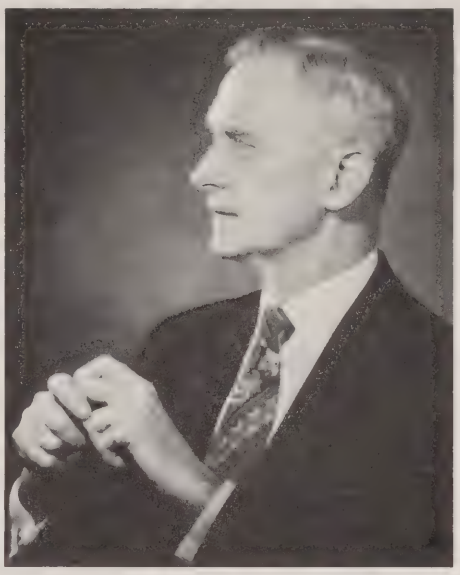
Dr. William H. Sweet, who retired this summer as Chief of the MGH Neurosurgical Service, made the prediction and added, "This subject represents an extraordinary challenge to the human race."

Dr. Sweet said methods for coming to grips with this mystery without destroying or otherwise perturbing the mind are popping up anew all the time.

"I think neurosurgery must seek to play a role in this exciting vista," he said, "or it will not be taking advantage of an excellent and magnificent opportunity."

Dr. Sweet does not intend to miss out on that opportunity. Retirement from the leadership post he held at the MGH for 16 years and as Professor of Surgery at Harvard Medical School is giving the internationally renowned neurosurgeon more time to pursue a goal close to his heart: the relief of pain.

A decade ago, Dr. Sweet worked with Patrick Wall, Ph.D., then a neurophysiologist at Massachusetts Institute of Technology, to develop the first convincing evidence that one could artificially activate pain-suppressor mechanisms electrically.



Dr. William H. Sweet

"In the years that remain to me," Dr. Sweet said, "I propose to seek a greater understanding about pain-suppressor mechanisms and their chemical activation."

During his medical career which thus far has spanned 41 years, he has developed a number of pain-relieving surgical procedures. Perhaps the most important and widely adopted is a technique to treat trigeminal neuralgia.

Affecting people mainly in the older age groups, trigeminal neuralgia is due to involvement within or pressure upon the nerve of sensation to the face – the trigeminal nerve. A patient with this condition can experience excruciating pain from a simple touch – or even a breath of air – on his face.

To halt the pain impulses, surgeons have often cut the sensory fibers of the nerve as they lie just outside of the brain. The totally numbed area of the face may paradoxically become constantly painful.

In the method devised by Dr. Sweet, a special needle-electrode is inserted into the cheek. By using different degrees of heat, surgeons burn out the pain fibers of the nerve while leaving relatively undisturbed other fibers governing sensations such as touch.

In place of the two weeks' hospitalization required by the brain surgery, Dr. Sweet's procedure calls only for an overnight stay, thereby saving patients a significant sum of money.

Since the advent of this method 10 years ago, it has been used to treat more than 1,000 trigeminal neuralgia patients at the MGH alone, producing relief from pain in almost every instance.

(Continued on Page 7)

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ous types of monitors to follow the patient's progress.

The van is commercially owned, and because of its high cost only one or two are available in Greater Boston. In addition to its spaciousness, the vehicle is equipped with overhead lighting, wall outlets for oxygen and suction (to aspirate a patient's chest tubes and windpipe), refrigeration for blood products, and a radiotelephone.

Since the mobile ICU went into operation three years ago, it has brought to the MGH 43 patients suffering hypoxemic respiratory failure considered unmanageable at their local hospitals. Nineteen of the patients, or forty-five percent, recovered.

The severity of their illnesses can be measured by the fact that the average RICU stay of the transferred patients was 27 days compared to a stay of 10.5 days for other critically ill RICU patients.

The mean age of the transferred group was 34 while that of the general RICU population was 57.

None of the 43 patients endured any complications related to the transportation.

"We feel it is reasonable to transfer anyone in the mobile ICU if the ground ride is no longer than four hours," Dr. Rie declared. "That means a radius of 200 or 250 miles from Boston."

Ground transportation suffices for 95 percent of the RICU referrals. They come principally from Massachusetts, Maine, New Hampshire, Rhode Island, southern Vermont, and northern Connecticut.

Referrals have traveled from other sections of the country, arriving by plane at Boston's Logan Airport and being met there by ambulance, but most of these patients were sent to be considered for the use of an artificial lung called an extracorporeal membrane oxygenator.

Currently this is a research treatment for certain extremely ill patients with acute lung injury.

Critically ill patients also have come from the offshore Massachusetts islands of Martha's Vineyard and Nantucket. In these instances, the Massachusetts National Guard or United States Coast Guard provided helicopter transportation to Logan Airport.

Once a military helicopter whirred Dr. Rie and his ICU team to North Conway, New Hampshire, to bring back the Speaker of the Massachusetts House, Thomas W. McGee, after he was seriously hurt in a skiing accident.

Cost is an ever present problem for the mobile operation run by Dr. Rie, an Instructor in Anesthesia at Harvard Medical School, but he emphasized, "We feel that a 45 percent survival rate in a very sick patient population with a mean age of 34 returns many more years of productive life to this very young group."

Neurosurgeons Guard Against Complacency

MGH neurosurgeons are being asked to devote increased time and study to specific types of disorders within their field.

The intent is to assure a constant preparedness within the hospital to carry out difficult neurological operations which cannot be performed readily in smaller medical centers.

The program will develop the kind of knowledge and expertise about a certain malady that would not be within the reach of a general neurosurgeon who might treat only one or two patients with that illness each year.

"An institution such as this must be able at all times to offer the very best attention to the really terrible disease problems that can arise," said Dr. Nicholas T. Zervas, new Chief of the MGH Neurosurgical Service.

Under the program drafted by Drs. Zervas and Robert G. Ojemann, Associate Director of the Neurosurgical Service, the latter, for example, has charge of various branches of tumor surgery, including that dealing with acoustic neuromas, tumors affecting the ear. Dr. Ojemann has earned an international reputation for his treatment of that disorder.

Dr. Robert M. Crowell directs the treatment of vascular problems such as aneurysms, balloonings along the walls of weakened arteries. Dr. Zervas expects Dr. Crowell to become a major force in that field.

Dr. Paul H. Chapman is primarily responsible for pediatric neurosurgery, and Dr. Raymond N. Kjellberg continues to work with proton beam radiation in treating pituitary gland diseases (*MGH News,* November 1969).

Similarly, other neurosurgeons will remain the guiding forces in areas of the field in which they have become expert. In the basic sciences, research studies led by Dr. Adelbert Ames III will continue to receive the same priorities that were established by Dr. Zervas' predecessor, Dr. William H. Sweet.

Coming to the MGH after 10 years as Chief of Neurosurgery at Boston's Beth Israel Hospital, Dr. Zervas has brought with him extensive experience with disorders involving the pituitary, or growth, gland. He looks forward to a close working relationship with Dr. Kjellberg in this area.

Dr. Zervas is noted for developing a surgical procedure called a stereotaxic thermal hypophysectomy – the destruction of the pituitary gland with electrodes which reach the organ through the nasal passage.

The operation, which previously necessitated cutting into the skull, has benefited patients suffering from diabetic retinopathy, which threatens blindness; spreading (metastatic) breast cancer; and acromegaly, a disease resulting from an overproduction of growth hormones and producing disproportioned, very tall people.

"In diabetic retinopathy, arteries in the retina of the eye proliferate and bleed," Dr. Zervas said. "We have operated on about 150 such patients, arresting the disease in 75 percent of them.

"Frankly, nobody knows how destruction of the pituitary gland assists these people. Dr. Sweet and Dr. Richard Field were instrumental in showing that pituitary surgery helped this disorder over 20 years ago.

"In the past 10 years we have performed the same stereotaxic operation on 300 to 400 women with spreading breast cancer and about 35 percent benefited. I know of at least one patient who was still alive nine years after the procedure."

Some patients develop diabetes insipidus after the cancer surgery, but that can usually be controlled with medication.

How the operation helps breast cancer patients also is not wholly understood. "The connection with the pituitary gland probably lies in the fact that the tumors are sensitive to certain hormones," Dr. Zervas stated. "These hormones are produced in the pituitary, and when you destroy the gland, the hormones no longer are active."

In acromegaly, only patients with the disease in a rampant state are considered for total removal of the pituitary gland.

Dr. Zervas said proton beam treatments are more suitable for those less severely ill since the radiation can be designed to destroy only the pituitary tumor causing the acromegaly. The entire gland need not be sacrificed.

With proton beam treatments, complications also are fewer, and costs are reduced because patients can return to work after only a two-day stay in the hospital.

In addition to his special interest in treating disorders associated with the pituitary gland, Dr. Zervas, who is Professor of Surgery at Harvard Medical School, is deeply concerned about strokes – damage to the brain from a ruptured or blocked artery.

For years he has conducted extensive research into the causes of strokes, particularly the role that may be played by "neurotransmitters."

These are chemical substances which send messages from one nerve cell (neuron) to another. Some neuro-

Dr. Nicholas T. Zervas, MGH Chief of Neurosurgery, confers with Dr. Lincoln F. Ramirez, a fifth-year neurosurgical resident, about the progress of a patient.

Dr. Sweet Devised Many Techniques to Halt Brain Disorders

(Continued from Page 5)

Operations of other types for which Dr. Sweet is noted include removal of an unusual tumor affecting young people. Located in the center of the head, the tumor, called a craniopharyngioma, is believed to result from some abnormal development before birth. Left untouched, the mass will continue to grow.

Dr. Sweet has demonstrated the ability to remove the growth without serious impairment to the patient.

Still another project in which Dr. Sweet was a pioneer involves aneurysms, dangerous outpouchings on the walls of arteries.

Normally surgeons place a clip on an aneurysm to prevent a possible hemorrhage, but sometimes the enlargement is in an area difficult to reach or is too big to clip.

The alternative calls for decreasing blood pressure in the danger area by placing a clamp on one of the two major neck arteries carrying blood to the head. Dr. Sweet developed the procedures of measuring the intra-arterial pressures to determine how far the pressure was reduced and how far it could be reduced for safe and effective treatment.

From this initial use electric recording of intraartery pressure has spread to many other areas and disorders and has become a routine practice throughout many major operations.

"His dedication to neurosurgery is total," said Dr. Peter Black, a third-year MGH neurosurgical resident who studied under the retired service chief. "This dedication is combined with a remarkable perseverance. He keeps at the task at hand until it's done to his satisfaction, and his energy in getting it done often seems limitless.

"He has spent his lifetime thinking about how the human nervous system works. Further, he has constantly asked how neurosurgeons might help to remedy its diseases."

Dr. Sweet was among the first individuals to stress the need for research training as part of the neurosurgical residency program at the MGH.

Through his efforts, the department, in order to probe basic problems in neurosurgery, gained laboratories in such fields as biophysics, neurophysiology, electron microscopy, neurochemistry, and immunology.

Dr. Sweet was one of the founders of M.I.T.'s Neurosciences Research Program, composed of noted scientists engaged in brain studies.

He also served in the late 1960s on a Harvard Medical School committee formed to establish medical guidelines

(Concluded on Page 8)

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transmitters travel in the blood. In laboratory tests they have exhibited an ability to constrict arteries.

"We've been working on strategies to try to prevent that in patients," said Dr. Zervas. "We've looked at a number of drugs which we think can diminish the amount of neurotransmitters in the blood.

"It may become possible to use such medication to reduce complications that stroke patients sometimes develop after entering the hospital."

Four or five years ago, Dr. Zervas and a colleague at the Massachusetts Institute of Technology, Professor Richard Wurtman, also discovered that some neurotransmitters in the area of a stroke may leak into dead tissue.

This posed a question which is still under study: As the neurotransmitters float around in this area of dead tissue, do they act upon tiny vessels on the periphery, thereby extending the effect of the stroke?

The research in which Dr. Zervas is engaged can be invaluable to an interdisciplinary team of MGH doctors and technicians dedicated to finding ways of slowing the course of strokes so that medicine and surgery can have time to limit the damage (*MGH News,* June-August 1976).

The new MGH Chief of Neurosurgery was born in the Boston suburb of Lynn, received a Bachelor of Arts degree from Harvard College in 1950, and four years later graduated from the University of Chicago School of Medicine with honors in surgery.

Dr. Zervas visits a patient in the MGH Neurosurgical Intensive Care Unit.

He trained as a surgical intern at New York Hospital, Cornell Medical Center; as an assistant resident in neurology and neuropathology at the Montreal Neurological Institute; and as a resident in neurosurgery at the MGH.

He interrupted his MGH training to spend more than a year as a Fellow in stereotaxic cerebral surgery at the University of Paris in France.

The treatment of choice for Parkinson's disease was stereotaxic surgery until about nine years ago when the drug L-Dopa came upon the scene.

Before joining the Beth Israel Hospital in Boston as its Chief of Neurosurgery, Dr. Zervas served for five years in the Philadelphia area. He was on the staffs of the Jefferson Medical College, the Philadelphia General Hospital, Wills Eye Hospital, and the Veterans Administration Hospital.

At present, in addition to his MGH position, he is a Consultant in Neurosurgery at the Beth Israel Hospital and at Children's Hospital Medical Center in Boston and is a Visiting Lecturer in the Department of Nutrition and Food Science at M.I.T.

At Harvard Medical School, besides his professorship, Dr. Zervas serves on the Faculty Council. He is a former chairman of one of the subcommittees on admissions at the school.

Because of the MGH's preeminence in neurosurgery, Dr. Zervas hopes one day to invite practicing neurosurgeons from around the world to visit the hospital for a month or two in order to keep abreast of developments in the field.

"A neurosurgeon not affiliated with any teaching hospital, working more or less on his own, would have an opportunity to see what goes on here and what technological advances have been made since he finished his own training years before," Dr. Zervas explained. "At the same time he could consult with us on any patient care problems he might have.

"I think this is an area in which we could perform a real service."

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An Enviable Record Follows Years of Study

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for physicians and hospitals in defining brain death. He has testified on the subject at murder trials.

In his youth, while considering a career, Dr. Sweet pondered becoming a lawyer. "I think I might have turned to law," he said, "if it hadn't been for the realization that we had some 50 separate jurisdictions at the time, each with its own concept of what the law was. Many of the differences seemed to be pathetically arbitrary."

Dr. Sweet graduated from high school at the age of 14 and later earned a bachelor's degree, summa cum laude, from the University of Washington. He ranked first in a class of 1,000.

Hoping to follow in the footsteps of his father, a prominent surgeon in the state of Washington, the young man entered Harvard Medical School in 1930. Six years were to pass, however, before he received his medical degree, cum laude.

In his second year at Harvard, he received a Rhodes Scholarship to study at Oxford University in England. He earned a Bachelor of Science research degree at Oxford before returning to Harvard to complete his academic work there.

Training in neurosurgery began at the MGH in 1936 and continued for the next three years at the University of Chicago Clinic and Billings Hospital. In 1940, Dr. Sweet returned to the MGH as a Research Fellow and for further special training in neurosurgery.

In the years that followed, Dr. Sweet compiled a record of progress, accomplishments, and honors matched by few of his peers.

On the basis of his research work and scientific publications, Oxford University presented him with a Doctor of Science degree in 1957.

He has served on committees and councils of the National Institutes of Health and on the Science and Technology Advisory Committee in the office of Manned Space Flight.

The number of professional societies of which he is a member runs long. He is a former President of the national Society of Neurological Surgeons, New England Neurosurgical Society, Boston Society of Psychiatry and Neurology, and American Academy of Neurological Surgery.

His broad interests in science have been both exemplified and nourished by his 19-year service as Harvard's scientific trustee on the governing Board of the Associated Universities. This association manages both the Brookhaven National Laboratory and the National Radio Astronomy Observatories.

A further example of his intellectual range has been his Fellowship in the American Academy of Arts and Sciences. This has included a term on its Council and later four years as its Vice-President for Biological Sciences.

Dr. Sweet has authored 285 scientific publications, including two textbooks on pain written in collaboration with Dr. James C. White, his predecessor as MGH Chief of Neurosurgery. The books are entitled, "Pain and the Neurosurgeon" and "Pain: Its Mechanisms and Neurosurgical Control."

Dr. Sweet's determination to learn everything possible about ways to relieve pain and to disseminate that knowledge is reinforced by an incident in Britain many years ago.

He operated on a patient who was suffering agonizing pain from cancer of the prostate. The surgery, called a cordotomy, was intended solely to relieve the pain. The patient died a short time later.

In offering condolences to the family, Dr. Sweet said he felt both amazed and chagrined that the patient had died so soon from his disease.

The relatives urged him not to feel bad. One of them expressed the sentiments of all: "Mr. Sweet, you gave our brother the only week of comfort he had had in a full year."

Dr. Sweet is shown during one of seven lectures he gave while serving as Honored Guest and principal speaker at the 25th anniversary meeting of the Congress of Neurological Surgeons in Atlanta, Ga., in 1975. The illustration he is looking at is one of his slides demonstrating that a single observation was sufficient to prove a complex scientific fact, in this case the existence of the so-called omega minus particle in physics.

MGH News

Vol. 36 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1977

Noninvasive Tests Reveal Blood Vessel Disorders

Was Phrenology Just a Fanciful Notion?

For the past century and a half scientists have frowned at the mere mention of the word phrenology.

Using such terms as "pseudoscience," "nonscience," and just plain "nonsense," they have consistently denounced the concept of German anatomist Franz Gall that a person's mental and moral characteristics could be determined simply by examining the shape of his head.

Dr. Gall argued that the shape of a person's skull was related to the contour of his brain, that various parts of the brain had certain functions, and that, therefore, a prominence in one's skull reflected development of specific traits in the brain.

By examining a person's head, he claimed, one could detect strong leanings toward such fields or conditions as music, mathematics, poetry, criminality, and even insanity.

Evidence existed to support the more generalized of Dr. Gall's arguments, but the tying of mental and moral qualities to physical characteristics drew quick attack as just a "fanciful notion."

Dr. Gall's philosophy ceased to shock long ago, but while phrenology disappeared, it never completely died. Many of the issues it raised remain unsettled. Where answers are needed, the search for truth goes on.

Studies including a new one reported by an MGH investigator indicate there may have been at least a germ of truth in Dr. Gall's eccentric theory.

The largest and most important part of the brain, making up 85 percent of its weight and accounting in the main for man's intelligence, is the cerebrum, somewhat resembling half a shelled walnut.

Each side is referred to as a hemisphere, and each hemisphere is divided into five portions: frontal, temporal, parietal, occipital, and limbic.

Except for the limbic, all of the sections are named for bones of the skull that cover them.

The two hemispheres were always regarded as being fairly symmetrical, but within the past ten years a team of neurologists reported finding sig-

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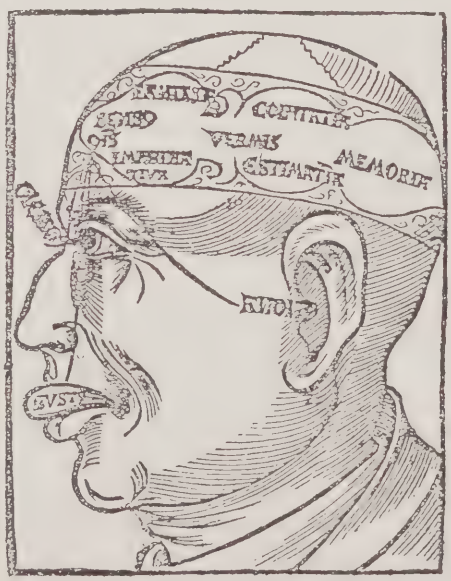

The concept that mental faculties occupied specific areas of the brain was debated in the Middle Ages. This map of the mind was published in the 15th century.

Following surgery to correct circulatory disturbances in his legs, the patient, in his 60s, felt almost back to normal. During postoperative visits to his doctor, he admitted that one of his legs retained some residual symptoms, but they did not bother him much.

His improved spirits and generally stable appearance pleased the doctor, but this change was short-lived.

As part of each checkup, the patient underwent a battery of sophisticated, noninvasive tests in the MGH Clinical Vascular Laboratory. Several months after his surgery, the tests began to disclose a rapid circulatory deterioration.

Although he personally sensed nothing seriously amiss, the patient could have developed massive blood vessel (vascular) blockages leading to the loss of not only a leg but perhaps a thigh and hip as well.

Alerted to the potentially catastrophic situation, the doctor ordered an angiogram (an X ray of blood vessels after injection of contrast material to show them). The angiogram, also called an arteriogram, quickly identified the source of the problem. Only a minor operation was needed at that stage to eliminate the difficulty.

Opened as a formal MGH facility only five years ago, the Clinical Vascular Laboratory represented a pioneering effort by the Department of Surgery to develop and employ noninvasive techniques in the evaluation of blood vessel disorders.

"More than 17,000 tests have been performed in the laboratory since its inception," said Dr. William M. Ab-

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EDITORIAL:

An Ounce of Burn Prevention

One of the sad facts about hospitals is that they mainly take care of people who are already ill. In the case of a teaching or tertiary-care hospital like the MGH, patients tend to be very sick by the time they have been referred. Increasingly, those involved in health care are arguing that individuals can do much more to help themselves to stay fit than physicians or doctors can do after illness strikes. That is why hospitals are placing added emphasis on public education about staying well.

Four institutions have just launched one such effort. Project Burn Prevention aims at using public education techniques to prevent burns. The news media is being asked to disseminate information about burn prevention, and a free booklet is available from BURNS, Boston 02114. Lynn, Mass., schools will teach specially prepared materials that focus on key risks by appropriate age groups. Community leaders in Quincy, Mass., will conduct outreach programs that emphasize protecting young children. In brief, these are the thrusts of the educational effort which represents two years of preparation. Included was research to determine how Boston area residents are burned, how they react in a burn emergency, and what they know about burn risks.

At the beginning and end of the project the research group will test a random selection of Boston residents. Tests administered to non-participants in the educational program will provide a basis to determine whether the teaching effort has paid off in a more informed public. Of even greater significance will be any change in the rate of burn injuries as determined by monitoring hospital records.

The organizations participating in the project are the MGH and its affiliated neighbor, the Shriners Burns Institute, and the Education Development Center of Newton, Mass. The National Fire Protection Association helped in the first phase by taking part in the gathering of burn-injury statistics. Two of the organizations, the MGH and the Shriners, have worked closely together since the founding of the Shriners which is staffed by MGH physicians. By sharing projects, both hospitals prevent a duplication of effort – the MGH treating burned adults and the Shriners, burned children.

To finance the study, the U.S. Consumer Product Safety Commission has allotted one sixth of its public education budget to provide the MGH with a total of $1 million over four years. The Commission is hoping that by its allocation of so large a percentage of its budget the Boston pilot program will prove so successful that it will become national.

Inaugurating the program at this time is fortuitous. As a page 7 article points out, the holocaust that was the Cocoanut Grove occurred 35 years ago this month. The hope is that Project Burn Prevention will one day lead to a public awareness which will reduce the deaths, disabilities, and disfigurement which are the tragic consequences of burning.

Noninvasive Testing Avoids Discomfort And Eases Costs

(Continued from Page 1)

bott, Chief of the Vascular Laboratory Unit, "and the rate of testing is increasing by seven percent a month. The lab accommodates patients from almost every service in the hospital."

The patients fall roughly into four categories. About 60 percent are tested for a suspected hardening of the arteries (atherosclerosis) in the lower extremities.

As many as 30 percent of these patients may be diabetic since poor circulation is a common problem with diabetes.

Some people find they cannot walk without pain. They want to know why. Others may have foot or leg sores that resist healing.

Cerebral vascular problems account for tests on another 20 percent of the patients visiting the laboratory. An additional 10 percent require upper extremity testing for abnormal spasms of small vessels, particularly in the fingers (Raynaud's disease), or testing for thoracic (chest) outlet syndrome in which arteries and nerves may be compressed as they leave the thoracic cavity.

The final 10 percent may have some form of venous disease such as thrombophlebitis (presence of a blood clot and inflammation of a vein).

Not long ago, to identify problems of a circulatory nature, the physician relied most heavily on examination of the patient, his medical history, and results of an angiogram, which involves a discomforting procedure that carries a minimal risk.

Today, while the angiogram remains important in determining whether surgery is required, a decision often can be reached without this diagnostic technique.

"Most people complain of a burning sensation when the contrast material is injected," said Dr. David C. Brewster, an MGH surgeon who is associated with Dr. Abbott in operating the Vascular Laboratory.

Photographs: Page 1, courtesy of Dr. Marjorie J. LeMay; pp. 3, 4, 5 (lower), Myron Daniels; pp. 5 (upper), 6, Robert Crivello; pp. 7, 8, MGH Photo Lab.

Using a noninvasive, MGH-developed Pulse Volume Recorder, Miss Donna Fulchino, RN, checks a patient in the Clinical Vascular Laboratory for possible problems in his leg arteries.

"An angiogram may require 30 minutes or hours to complete. It all depends on the extent of the area to be examined. The procedure also is expensive and calls for two days of hospitalization."

Because of angiography's shortcomings and, more important, the fact that it cannot be used repeatedly to monitor the progress of patients, efforts were initiated at the MGH as early as 1969 to organize and improve noninvasive diagnostic methods.

Teaming up to conduct the project were Dr. R. Clement Darling, an MGH surgeon who presently serves as a consultant to the hospital's laboratory, and Jeffrey K. Raines, Ph.D., a biophysicist who now directs research and the Vascular Laboratory at the Miami Heart Institute in Miami Beach, Fla.

In looking for diagnostic techniques that could be performed routinely, the two investigators kept in mind that angiography provides only information about the structure (anatomy) of a blood vessel.

"They felt that functional information showing how the circulation was working was also vital," said Dr. Brewster. "For example, many patients may have a blockage in an artery but experience very little trouble from it. Surgery would not be warranted unless a functional impairment accompanied the anatomic finding."

During the initial investigative period, Drs. Darling and Raines developed new instrumentation to complement devices already in use.

One instrument they designed was a Pulse Volume Recorder. Using blood pressure cuffs, the machine measures and records instantaneous variations in the volume of blood within a specific limb segment. The cuffs are available in different sizes for all portions of the limbs.

Coupled with use of a technique called Doppler ultrasonography, which permits the doctor to listen to blood flow, and exercise testing employing a treadmill, firm blood-flow data can be obtained to aid in the care of the patient with peripheral vascular disease.

Since the tests are noninvasive (do not require placing instruments or substances inside the body) and are inexpensive, they can be repeated whenever advisable.

Dr. Abbott, an Associate Professor of Surgery at Harvard Medical School, pointed out that although the treadmill moves at only 1½ to 2 miles an hour on a 10 percent grade, one of every three patients tested on the equipment simultaneously receives cardiac monitoring.

"We've stopped the treadmill a number of times to protect patients," he said, "but never, in thousands of tests, have we encountered a cardiac arrest [heart stoppage]."

The nurses who administer the various tests in the laboratory, Misses Nancy Reidy, RN, and Donna Fulchino, RN, have undergone extensive training, including service in intensive care units. Miss Reidy is the laboratory's Technical Director.

To check for cerebral blood problems, the laboratory personnel use four techniques. While Doppler equipment listens to blood flow, a procedure called Carotid Audio Frequency Analysis records "bruits," noises caused by narrowings in the major arteries.

Experience in working with these recordings has led to firm criteria in judging the severity of any blood-flow impairments.

Using a variation of Doppler ultrasonography, it now is also possible to noninvasively capture on film a picture of a carotid artery problem.

The fourth cerebral test, which bears the impressive title of ocular pneumoplethysmography, calls for applying to the surface of an eyeball a little suction cup similar to a contact lens. A technician can thus measure pressure in the ophthalmic artery supplying blood to the eyeball.

To evaluate other vascular difficulties encountered in the laboratory, the technicians have found the Pulse Volume Recorder to be the most valuable diagnostic tool.

Noninvasive diagnostic testing is particularly valuable in accident emergencies. Before a fractured leg is reset and placed into a cast, physicians can quickly check for possible injuries to arteries. If such injuries went undetected for 24 or 48 hours, the patient could lose his leg.

Before the MGH Clinical Vascular Laboratory was established, about one-third of the patients who underwent costly, discomforting angiography at the hospital did not go on to have surgery.

Today, thanks to reliable, noninvasive, less expensive methods of assessing the need for an operation, records show that virtually all patients who now undergo angiography turn out to require surgery.

"While only a handful of comprehensive, institutional-based, diagnostic vascular labs such as ours exist across the nation," said Dr. Abbott, "the system has really begun to catch on.

"Of the total number of patients now tested each month at our facility, more than 25 percent are referred by physicians who have no direct relationship with the MGH."

Study Of Handedness Rekindles Thoughts About Phrenology

(Continued from Page 1)

nificant differences in the temporal (temple) lobe of each hemisphere, specifically in areas known to be of major importance for language function.

With the advent a few years ago of computed tomography (CT) scanners, capable of presenting much more detailed information about the brain in living persons than has previously been possible, interest in cerebral asymmetries accelerated.

Reflecting on the findings of the neurologists, Dr. Marjorie J. LeMay, an MGH radiologist, became curious as to whether a relationship existed between asymmetries of the skull and right and left handedness.

"I felt that the radiologist was in an excellent position to carry out such a study," she said, "because with advanced radiological techniques we could readily detect asymmetries, and we could also interview the patients. Previous studies of the brain and skull often were conducted at postmortem."

With the cooperation of many members of the MGH Radiology Department and the Harvard University Health Service, Dr. LeMay, an Associate Professor of Radiology at Harvard Medical School, studied a significant number of individuals.

For the most part, they were patients for whom skull examinations and/or CT studies had been requested to check on symptoms of severe, persistent headaches; pituitary or sinus disease; or some other disorder.

In an article published recently in the *Journal of the Neurological Sciences* and entitled in part, "Phrenology Revisited," Dr. LeMay reported that her study over 18 months showed distinct asymmetries of the skull among a majority of the right handers tested.

On the CT scans of the right handers, the right side of the frontal (front of the head) bone extended forward beyond the left side in 79, or 66 percent, of 120 heads examined.

The degree of imbalance was even more striking in the occipital (back of the head) bone. It extended farther backward on the left side than the right in 92, or 77 percent, of 120 heads.

Asymmetries similar to those in adult right handers were found in a majority of CT scans of 22 children under the age of 1 year. Five were less than 7 days old. Eighteen, or 88 percent, of the 22 children showed a right frontal protrusion and 15, or 68 percent, showed a left occipital protrusion.

Significant asymmetries were not found in left handers, but Dr. LeMay noted that forward protrusion of the left frontal bone and posterior protrusion of the right occipital bone – features opposite to those of most right handers – were more frequent in the left handed group.

Dr. LeMay said measurements on basal views of the skull probably were less dependable than those of the CT studies, but the basal view data nonetheless concurred with the findings of the CT scans.

The MGH investigator believes that criticism of Dr. Gall often stemmed not from what he did or said but from the irresponsible declarations of his followers.

The theory that different parts of the brain contained the seats of certain mental faculties originated as far back as the Middle Ages. Dr. Gall claimed to have isolated 26 organs corresponding to a like number of mental functions. Other phrenologists added to the list, at the same time expanding assertions that the structure of the skull correlated with underlying cerebral centers.

A "base view" X ray of the skull is taken by Mrs. Miriam Marino, Head Technologist in the Baker One Ambulatory X-Ray Unit.

Accompanying the mushrooming claims was an outpouring of demands to defend those beliefs.

In its heyday, the cult of phrenology was represented by more than 29 organizations and touted by a number of journals.

Many influential men supported phrenology, among them British statesman Lloyd George. He once invited a famous writer he had never met to Christmas dinner because, he admitted later, he thought the author had an interesting head.

"Despite the acrimonious atmosphere in which he found himself, Dr. Gall did make important contributions to medicine," Dr. LeMay pointed out. "He was one of the first persons to identify a language center in the brain. This was long before neurologists did."

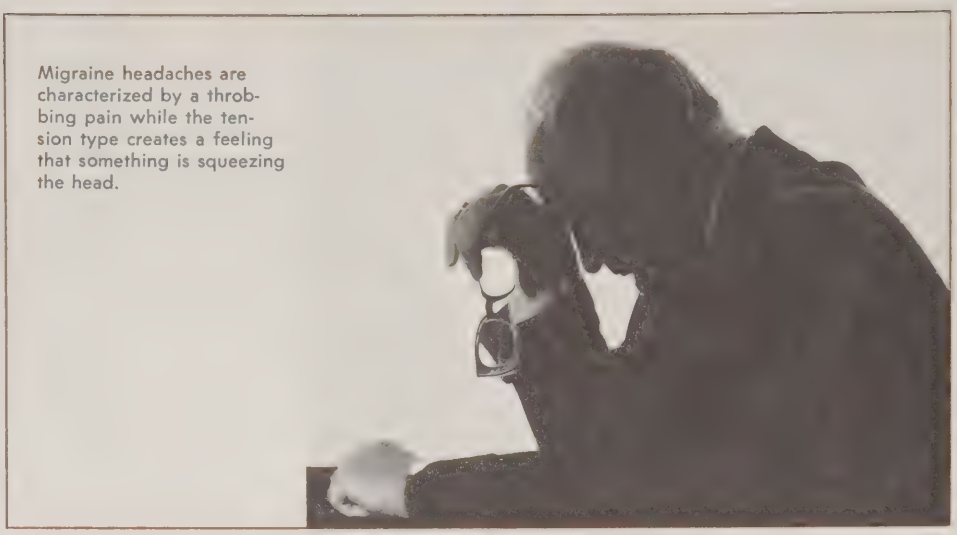
Dr. Gall also called medicine's attention to the essential differences between the grey and white matter of the nervous system in structure and in function.

As for phrenology, Dr. LeMay suggested that "all of us tend to judge people a little by their facial appearance. I'm sure the shape of the brain does have a small effect on how we look."

In her published paper on asymmetries of the skull and handedness, she also wrote:

"The study reported here suggests that there was a core of correct reasoning beneath the fancifully exagger-

Headaches Sometimes Indicate a Complex Medical Problem



Migraine headaches are characterized by a throbbing pain while the tension type creates a feeling that something is squeezing the head.

One of the most common disorders besetting mankind is also one of the most difficult to evaluate.

Of all the patients who visit physicians' offices, more than half complain of headaches.

Unlike an infection, inflammation, or degenerative change in the body, a headache is not a disease but a symptom of some underlying problem.

The vast majority of people who experience headaches, including those who consult physicians, find that increased rest, proper diet, and medication will quickly relieve the difficulty.

Providing a remedy for the other headache sufferers, however, can pose a real challenge for the physician. The list of ailments capable of causing the problem is almost endless.

"If you have an occasional headache that goes away and doesn't return for a few weeks or more, I would say you're entitled to treat it with benign neglect," said Dr. Gerald F. Winkler, an MGH neurologist who has delivered postgraduate Harvard Medical School lectures on headaches.

"If, however, you're concerned about the pain and fear that you have some serious illness, then consult a doctor. If it's nothing, he'll tell you. If it's something, he can deal with it.

"To carry on in a state of anxiety and suspense, not knowing, is worse than knowing, even if it turns out that you have a serious malady."

Two types of headaches predominate: "migraine," marked by a throbbing pain, and "tension," which gives one the feeling that his head is being squeezed in a vise. Sometimes both symptoms blend in the same attack.

A migraine is thought to arise from a swelling or stretching of blood vessels in the head. In classic migraine, flashing lights, possibly even a loss of vision or a partial paralysis, precede the characteristic headache.

These conditions customarily clear only to be followed by an increasingly severe pounding on one side of the head. The patient becomes nauseated, unable to continue work, and sensitive to light. He must retreat to a darkened room and lie down. The attack may last a few hours or persist for a number of days.

Often, a migraine patient can cite a family history of the affliction. But Dr. Winkler said there is no blood test or other measure by which to diagnose the condition.

"For many years chronic recurrent headaches were attributed to sinus trouble," he said. "An infection in the sinus region could cause an acute pain, but I believe that the chronic recurrent disturbances more often than not were of a migrainous nature.

"These can begin at any age, but they usually occur when the patient is in his late teens or early 20s. Occasionally, the onset is noticed in midlife."

Surprisingly, migraine may be felt not only during stressful situations but also *after* hectic activity, such as during the first day of a vacation or when a formal party is over and the guests have left. There is no ready explanation.

Of particular concern to physicians is the "cluster headache," thought by

(Concluded on Page 6)

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ated notions of Gall. There is certainly evidence that a relationship exists between the shape of the normal brain and the shape of the skull, and just how significant this relationship may be remains a topic for further research."

* * *

[EDITOR'S NOTE.] – *The above article describes research which has some rather casual relationship to the long discredited art of phrenology. By reporting the study, the* MGH News *in no way implies that our readers should rush out to find their friendly local phrenologist. We present the article as an interesting one which merely suggests that phrenology in one or two of its most general, least preposterous assertions* MAY have some tiny germ of truth. *We maintain an open attitude.*

Dr. Henry J. Llewellyn, MGH radiologist, discusses a base view skull film with Miss Claire Little, (left), and Mrs. Christine Ferguson, X-ray technicians.

Cluster Headaches Create Agonizing Pain

(Concluded from Page 5)

some to be a member of the migraine family. Former Boston Red Sox relief pitcher Dick Radatz, who suffered from cluster headaches, once referred to them as "the worst pain known to man."

They come on very rapidly. The majority develop at night and awaken the patient from sleep. Although each may last only a half hour, they occur nightly for several weeks or months and disappear as inexplicably as they come. The term "cluster" refers to this time-course. Once ended, the cluster headaches may not recur for two or three years.

Muscle contractions in the scalp or back of the neck bring on the tension headaches, affecting both sides of the head and delivering a constant rather than throbbing pain. These may be due not only to familial and on-the-job stresses but to depression as well.

"There are two kinds of depression," said Dr. Winkler, an Assistant Clinical Professor of Neurology at Harvard Medical School. "One is termed reactive depression. It may arise when a person, for example, loses a job. Resolution of the unfortunate circumstances tends to correct this condition.

"More serious is 'endogenous' depression, a form which seems to be a part of a person's biochemistry. Heredity may play a role here. Physicians in the past have prescribed electric shock treatments. Occasionally this is still recommended."

Sometimes, a patient beset with severe headaches will consult the family physician; an internist; an ear, nose, and throat specialist; and a neurologist without a conclusion being made. The psychiatrist usually steps in next.

"Something emotional may be going on within the patient that is not at the conscious level," said Dr. George B. Murray, an MGH psychiatrist.

He spoke of a woman who developed headaches in the presence of her mother and also in his office whenever the discussion focused on the parent.

"It was clear that the patient felt rejected by the mother," Dr. Murray said, "but this was too painful to admit, so the patient developed headaches subconsciously to evoke sympathy from the mother."

Headaches may also represent a delayed grief reaction. A widow may suffer a headache a few hours after cleaning a room where her deceased spouse had spent much pleasant time each day. Each cleaning would be followed by another episode of pain.

"You would probably find here that the woman had to assume the role of the strong person in the family when the husband died," Dr. Murray said. "By discussing the husband with the widow, mentioning many of his fine traits, she might be induced to release her emotions, and that could halt the headaches."

The head is not the only target organ for such problems. From earliest times, physicians have known that emotions can influence the acidity of the stomach.

During the Civil War, a soldier's stomach was laid bare by a wound. Studying the patient physiologically a military doctor detected how stresses affected the redness of the lining of the organ.

Emotional influences can affect how fast your heart beats and how much you perspire. This is the basis for the operation of the lie detector.

The brain is insensitive to pain, but the bones, membranes, and major blood vessels in the head are sensitive. A tumor stretching, tugging, or pushing upon the membranes and blood vessels can create pain.

People sometimes get headaches after having a spinal tap, a procedure for diagnosing a medical problem. The brain floats on spinal fluid so when some of it is removed through the lower back, the fluid pressure drops and the brain sags. This creates extra tension on a number of brain attachments. The headaches will often stop when the patient reclines because the brain is no longer tugging at the upper attachments.

Physical ailments such as constipation, infections, and allergies, often produce headaches.

A few more potential causes of head pains include glaucoma, a concussion, low blood sugar, meningitis, use of nitroglycerin by heart patients, inhalation of carbon monoxide gas, a seizure (convulsion), a collection of blood either on the surface of the brain or within, occasionally high blood pressure, and certain foods.

Dr. Winkler warned that an important fact to remember about migraine headaches is that they pose a slight predisposition to stroke.

Because studies have shown a somewhat increased incidence of strokes and heart attacks among women who take birth control pills, the neurologist cautioned that women subject to migraines should not use birth control drugs.

"I would not like to see two risk factors present in the same individual," he said, "when one of the two is avoidable."

Although no panacea exists for migraine sufferers, physicians do have certain highly potent medications which, taken in the early stages of an attack, can do much to relieve distress.

"Selecting a treatment for a headache is like trying on shoes," Dr. Winkler said. "It's very individualized. Very likely the first thing we try won't be satisfactory. We might have to shift to something else, and then adjust the dose, but the right recipe will usually be found."

Since a headache can be attributed to any one of a multitude of causes, a simple pill is no guarantee of relief.

Twenty nurses worked each eight-hour shift on the special MGH ward set up under a disaster plan to care for the Cocoanut Grove nightclub casualties.

Recalling a Challenge in Patient Care

Thirty-five years ago this month, a Boston tragedy stunned the world. Hundreds of people died, but a series of coincidences enabled the MGH to save many who would otherwise have perished.

Paradoxically, lessons learned from the disaster also later saved countless other lives during World War II.

It was a Saturday night, November 28, 1942. The Cocoanut Grove nightclub in downtown Boston was jammed with a crowd estimated at 1,000. Many of the merrymakers were celebrating a Holy Cross College football victory over Boston College.

At 10:15, fire erupted in the one-story stucco and brick building on Piedmont Street. Patrons and employees alike panicked. Rushing for exits, scores were trampled. The main exit, containing a revolving door, was blocked by a crush of bodies.

A total of 491 lives were lost. The victims included cowboy movie star Buck Jones, a bride and groom married only three hours earlier, and all 22 members of a party celebrating an engagement.

By far the largest number of casualties, more than 400, were taken to Boston City Hospital. Nearly 300 were dead on arrival.

At the MGH, the first casualties arrived at 10:30. Within two hours, 114 people were brought in. All but 39 of them either were pronounced dead on arrival or succumbed in that 120-minute period.

Those who had a chance for survival found the hospital well prepared to care for them.

Because it was wartime, the hospital could not overlook the possibility of enemy action which might deluge the institution with patients. Drs. Nathaniel W. Faxon, General Director of the MGH, and Edward D. Churchill, its Chief of Surgery, already had devised a patient management plan in the event of any catastrophe.

In addition to designating personnel for emergency duty, the program enabled hospital officials to know at a moment's notice which floor could be readily evacuated to make room for disaster victims.

At the time of the nightclub holocaust, the sixth floor of the MGH's White Building held the fewest patients. Within minutes, they were transferred to other areas of the hospital.

The hospital's preparedness also extended to new techniques for treating burns. Put to their first large-scale test by the tragedy of the Cocoanut Grove, the treatments proved so successful that they later became the standard procedures employed throughout the armed forces.

For almost a year prior to the fire, a special unit led by Dr. Oliver Cope, an MGH endocrinologist and surgeon, had worked under a National Research Council grant to develop more efficient modes of tending patients burned during calamities.

"When the Japanese had attacked Pearl Harbor the previous December, they dropped many fire bombs, and some of the injured, both military personnel and civilians, literally had to wait days before receiving aid," Dr. Cope explained.

"The reason was that since 1926, the standard method of treating burns was a long drawn-out process. It called for removal of the blisters, careful cleaning of the burns, and then spraying the wounds with tannic acid, the same agent used to tan hides.

"The acid created a protective cover over the injury, but to be effective the spraying had to be done over a period of several hours. That involved as many as four or five people in the care of a single patient."

Dr. Cope, Professor of Surgery, Emeritus, at Harvard Medical School, also said that too much immediate attention was paid in those days to burns and not enough to internal injuries, such as pulmonary difficulties and the loss of vital fluids.

Dr. Cope had felt for a number of years that if you left a blister unruptured and merely protected it with a coating of petroleum jelly and a sterile bandage, the wound would often heal nicely.

He interested the National Research Council in this unorthodox approach and later proved his theory in scores of tests. With the help of sulfa drugs, virtually all of the wounds remained sterile.

During his studies, Dr. Cope also developed a formula for anticipating the fluid needs of a burn patient and for preventing shock.

Another MGH surgeon, Dr. Bradford Cannon, joined in demonstrating that the Cope procedure worked. He removed a strip of skin from a volunteer, using a special device to make sure the depth of the wound was the same throughout. Then he divided the surface into three areas, each to be

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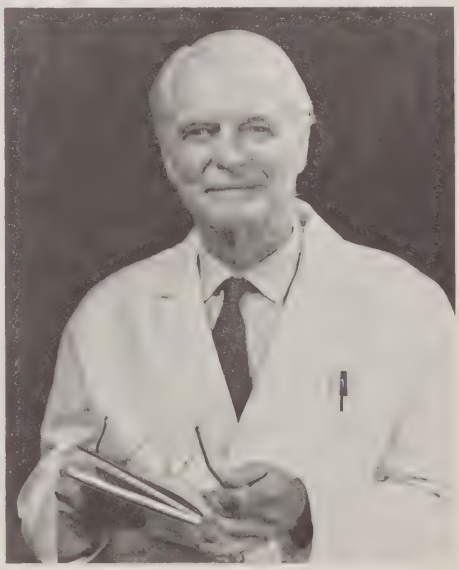

Dr. Oliver Cope

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Cope Plan Revised Patient Care Priorities

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treated in a different manner. One method involved tannic acid; another, a mixture of aniline dyes; and the third, petroleum jelly.

The healing turned out to be twice as fast with the jelly as compared to the tannic acid. The dyes had the slowest healing.

With the Cope method used to treat the Cocoanut Grove survivors, physicians and nurses had the time to devote early attention to internal problems of the patients.

Lung injuries constituted the most severe and pressing problem. The complications encountered by the MGH staff resembled those resulting from the inhalation of certain war gases. Of the 39 patients treated, only three were wholly free of respiratory damage.

All suffered from cold, exposure, fright, and varying degrees of shock, in addition to burns.

Huge quantities of whole blood and frozen plasma were provided. Here, too, the MGH stood ready when disaster struck. The MGH Blood Bank, directed by Dr. Lamar Soutter, had formally opened just seven months before the nightclub conflagration.

Blood donors began arriving at midnight on November 28, and the flow did not ebb until noon of the following day. Because of many private gifts as well as hospital funds, the Blood Bank possessed adequate special equipment to deliver the necessary volume of plasma.

Teams of physicians and nurses were in constant attendance on White 6. At least 20 nurses worked each eight-hour shift on the ward.

Only seven of the 39 patients died from their injuries. Fourteen remained in the hospital after the special casualty ward was discontinued on December 13, 1942. Ten of these patients had suffered third degree burns of sufficient extent to require further treatment. Only one of the ten was hospitalized for as long as 18 weeks. The average stay of the others was ten weeks.

A month after the nightclub fire, and only 13 months after Pearl Harbor, the National Research Council recommended governmental adoption of the MGH burn therapy. In June 1943, a monograph describing the new simplified treatment concept was published and was immediately distributed to all of the military services.

At the time of the Cocoanut Grove fire, physicians saw little chance that a patient with full thickness (third degree) burns covering 40 percent of his body could survive. Since then the progress in burn research has been substantial.

"I would say that it is now often possible for a patient with third degree burns over 80 percent of his body to recover," said Dr. John F. Burke, Chief of the MGH Burn Unit and Chief of Staff at the nearby MGH-affiliated Shriners Burns Institute.

Dr. Burke said that over the past 35 years the medical profession has solved many of the physiologic problems that often accompanied major burns.

"Today, in treating even the most serious burn," he said, "we can usually manage all of the patient's needs while at the same time proceeding directly with the excision of dead tissue and closure of the wound."

One major development in aiding burn patients was the establishment of a joint MGH-Shriners Burns Institute skin bank. A process of freezing and thawing skin, devised by MGH scientists working in the Burns Institute laboratories, permits the storage of skin for at least a year instead of an earlier limit of two weeks.

The skin bank not only helps to ease the pain of the patient but also reduces the extent of his hospitalization and expenses.

The treatments formulated by Dr. Cope were not regarded as the ideal, but, as his colleagues remarked, "they proved the best available at the time."

Dr. James H. Means, then Chief of the MGH Medical Service, wrote in the Harvard Alumni Bulletin:

"Horrible as it was, the Cocoanut Grove disaster saved more lives than it destroyed because it amounted to a perfect trial workout for the treatment of severe burns in wartime, and the lessons learned from it were applied in every theater."

Oxygen tent aids the breathing of an MGH patient hurt in the Cocoanut Grove nightclub fire. Of 39 patients treated at the hospital for various injuries, only three escaped respiratory injury.

MGH News

Vol. 36 No. 9 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS December, 1977

MGH Television Promotes Good Health Practices

Young Heart Patient Begins to Enjoy Life

The handsome, blond youngster sprang from the pool's edge and slashed through the water with a swimming style all his own.

Though a lifeguard accompanied him, occasionally assisting, David Shirkey swam half the length of the Olympic-sized tank, swung around, and whipped his way back. In all, he negotiated five round trips.

The feat represented David's latest victory in a struggle waged since birth to overcome the debilitating effects of, not one, but a host of heart and other physical problems.

When he was born in Lakeland, Fla., 12½ years ago, physicians doubted that David would survive. Today, however, after three heart operations, the first of them in Florida, and other treatment, he shares most of the pleasures enjoyed by children his age.

That has not long been the case. David was born with his heart on the right side of his chest instead of the left. His abdominal organs were also reversed. There was a hole in the wall separating the two pumping chambers (ventricles) of his heart. And both his body's main artery (aorta) and pulmonary artery emerged from the left ventricle. Normally, the pulmonary artery leads out of the right, lower chamber.

Because of its extremely unusual position, the pulmonary artery allowed for flooding of David's lungs with blood and caused his heart to begin to fail.

Surgeons in Florida undertook two measures to save the infant. They placed a band around the pulmonary artery to reduce the blood flow, and, to improve circulation within the heart, created an opening between the upper two chambers (the right and left atria) of the four-chambered heart.

During his first five years, David spent all of his waking hours either in bed or in a wheelchair. Then on February 20, 1970, his fifth birthday, he entered the MGH for surgery.

As a result of the boy's growth, the band on his pulmonary artery had become too tight and was excessively curtailing the flow of blood to his lungs to obtain oxygen.

Dr. W. Hardy Hendren III, MGH Chief of Pediatric Surgery, corrected

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After spending years in a wheelchair, David Shirkey, 12, now participates in a variety of sports, including swimming.

The bill for health care in the United States last year exceeded $139 billion, but leaders in the field contend the figure could be reduced appreciably if people stopped making themselves sick.

A United States Senate committee, for example, has found that six of the 10 leading causes of death are related to diet and that one third of America's population is overweight to a degree that affects life expectancy.

Simply stated, if healthy people change their life-style, they can probably improve their chances of warding off disease and its high toll on the body, mind, and pocketbook. If those becoming ill recognize and heed early warning signals, they can often avoid serious illness and the high cost of hospitalization.

To provide a more thorough understanding of diseases, including their impact and treatment, and to foster a greater awareness of the need sometimes to alter one's life-style, the MGH has expanded what was an experimental, televised, educational campaign among its patients.

"This new program represents one part of a long-standing but growing commitment to the total needs of the patient," said Dr. Charles A. Sanders, General Director of the MGH. "Merely treating the physical effects of disease is not enough."

The effort to help patients help themselves is waged over WMGH, the hospital's own closed-circuit television channel. It beams programs without charge throughout the medical complex on Channel 12.

The programming began with a two-hour-a-day pilot offering on September

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EDITORIAL:

Your Patient Is Ready, Sir

For many years surgery has fired the public's imagination. One conjures up an image of the operating room as a place where drama unfolds second by second. All eyes rivet every moment on the surgeon's scalpel. When the last suture is made and the patient's vital signs remain good, everyone sighs as one and congratulates the surgeon. Or so Hollywood depicts the scene. In reality, the operating room, of necessity, is a more relaxed place. If every second of a lengthy procedure were tense, the surgical team would be so emotionally and physically drained that the risk attendant to fatigue would become a serious factor. Thus there are long periods even during difficult open heart surgery in which the atmosphere is relaxed rather than tense.

The public generally conceives of the surgeon himself as the man on whom success or failure depends. In a sense this popular conception is correct. All operating room activities take place to help the surgeon treat the patient. Yet without the carefully trained and coordinated operative team, the surgeon is helpless. Nurse and technician are essential to the surgeon's performance. And one specialist plays a major part which can on some occasions prove as vital to the patient's well-being during the procedure as even the surgeon's role.

He is the anesthetist. For him to perform his tasks well, his knowledge, skill, and ability to act promptly and intelligently under pressure demand expertise. When the patient has certain conditions, the anesthetist must be able to summon quickly all his knowledge and training to keep that patient alive. In the less surgically demanding procedures that require general anesthesia, the skills of the anesthetist may be especially significant in preventing the operation from becoming risky. That patients seldom die of anesthesia problems is a testimony to the successful performance of the anesthetist.

In history's first operation involving a nonsurgeon anesthetist, this man administered sulphuric ether to render the patient insensible. Dr. William T. G. Morton, the anesthetist, then turned to the MGH surgeon and said, "Your patient is ready, sir." A less formal variation of those historic words is still used in operating rooms throughout the English-speaking world. What has changed are the knowledge and skill of the anesthetist himself. In modern medicine he has become a vital expert.

Special Panel Selects Television Programs To Aid Patients

(Continued from Page 1)

28, 1976. Patients reacted with such enthusiasm that this month, after considerable preparation, the MGH is prepared to increase its daily schedule of telecasts to eight hours in length, from 10 a.m. to 6 p.m., Monday through Friday.

The filmed presentations vary considerably not only in subject matter and content but also in theme.

"People learn differently," said Stephen H. Kauffman, MGH Director of Administrative Services who chairs a subcommittee that developed the television operation. "We look for films that instruct in a variety of ways.

"For those interested in heart disease, for instance, we offer such diverse programs as 'The Frightening Feeling You're Going to Die,' a tense dramatization about three heart patients; 'Heart Attacks,' an informal discussion about their cause and treatment; and 'Eat to Your Heart's Content.' an entertaining film explaining the effects that food can have on heart disease.

"By approaching the subject in different ways, we can attract and hold the interest of more viewers. After finding one program informative, a patient very likely would be anxious to see others."

In addition to heart disease, the TV topics embrace such health concerns as nutrition, smoking, hypertension, diabetes. obesity, low back pain. stress, cancer, headaches, stroke, blood vessel irregularities, emphysema, ulcers, foot care, and skin problems.

The new television format represents more than two and a half years of work spearheaded by the Patient Education Subcommittee. It is supervised by the MGH Committee on Teaching and Education whose chairman is Dr. Henry J. Mankin, Chief of Orthopaedic Surgery.

Members of the subcommittee include delegates from administration, medicine, surgery, News and Public

Photographs: Page 1, Gene Dixon, Boston Herald American; p. 3, courtesy of WMGH; p. 4. courtesy of Easter Seal Society; pp. 5, 6, Myron Daniels; pp. 7, 8, Joyce Libby.

Dale Wickberg, manager of the MGH Television Department, edits videotape using a special effects generator.

Affairs, Nursing and Staff Education, Dietary, Medical Records, the Office of Patient Care Representatives, and lay volunteers who have been MGH patients.

The Patient Education Subcommittee convenes weekly to view films proposed for showing over Channel 12 and to judge whether the productions conform to patient needs.

After passing this test, each film must still be reviewed by experts in the fields being discussed. These professionals rule on the technical accuracy and medical value of the presentations.

When the pilot series was televised for a three-day period more than a year ago, patients received program notices on their meal trays. Even if a patient had not rented the television set installed in his room, he could still switch on Channel 12.

To assess viewer interest, volunteers distributed questionnaires after the brief series. The response was so positive that the telecasts were resumed almost immediately on a continuous, albeit limited, basis.

Although MGH television will air 40 hours weekly, the program content actually will total half that amount of time. The channel will repeat each program once during the week.

Dale Wickberg, manager of the MGH Television Department, explained that "during our pilot series, we learned that our biggest competition was not commercial TV but patient scheduling conflicts. Patients planning to watch certain programs either found themselves under medical treatment at air time or were having visitors."

Repeat performances accommodate not only these patients but also others just being admitted to the hospital.

Nursing, dietary, and other staff personnel receive a synopsis of each program. Thus, while they might be too busy to watch a particular film, they are prepared to answer questions which a given presentation stimulates.

The films do not replace the doctor's instruction to his patient. However, since patients can gain a good insight into their own medical problems by watching TV, the physicians can devote proportionately more time to discussing treatment and the necessity of altering life-style to permit a return to good health. The channel can, therefore, supplement current educational activities of doctors, nurses, dietitians, and other health professionals.

Mr. Wickberg described the initial hunt for television material as a "sort of blind search."

"It took a lot of leg work contacting various national foundations, associations, and agencies to obtain the films we needed," he said, "but one source seemed to lead to another. A number of colleges and hospitals around the country gave us both encouragement and guidance."

MGH staff personnel participate in many of the films shown on Channel 12. Examples include selections from "House Call," the Boston Channel 5 series hosted by Dr. Timothy Johnson, an MGH physician.

A major segment of "Strange Sleep," an hour-long documentary tracing the development of anesthesia, was filmed at the MGH. A number of MGH physicians appear in character roles.

WMGH hopes in time to produce its own educational films. "Many of our teaching needs at the MGH are very specific," Mr. Wickberg explained. "The material available from such groups as foundations and associations tends to be general in nature and therefore is often not as applicable as we would like.

"Our own films would reflect not only MGH practices but the philosophy of its professionals, many of whom are leaders in their respective fields of medicine."

The MGH productions would be made available to other medical facilities at nominal fees that would serve to underwrite production expenses.

WMGH already has the capability of producing films in either color or black and white and is licensed to broadcast to other hospitals.

"We're deliberately moving slowly," said Mr. Kauffman, "because each step we take is accompanied by an assessment of our progress. By validating each effort in terms of how well it contributes to good health practices and an improved understanding of medical care, we will be able to offer programs that are better and better."

Artificial Artery Strengthens Heart Patient

(Concluded from Page 1)

the problem by installing a kind of detour (shunt) to bypass the band.

The operation altered the course of David's life. After being completely dependent upon his wheelchair, the child now was able to marshall enough energy to leave the chair for long spells.

Still he became a familiar visitor to the MGH. Mrs. Marjorie Shirkey brought her son to the hospital's Emergency Ward on a number of occasions to be treated for kidney ailments, eye problems, fevers, and infections, all unrelated to his heart condition. Once he required medication for a heart-rhythm irregularity.

Although Mrs. Shirkey and her family moved to Boston seven years ago from the northeastern Massachusetts town of North Billerica, Dr. Leonard Bram of that community continues to serve as David's pediatrician.

At the MGH, David's medical care is guided by Dr. Allan Goldblatt, Chief of Pediatric Cardiology.

"The operations that David underwent during his early years allowed him to grow sufficiently so that we could better study his heart and arteries," Dr. Goldblatt said.

Two years ago, a pair of procedures called cardiac catheterization and angiography documented the full nature of the youngster's difficulties.

The catheterization involved passing a thin tube through a vein into the heart so that various diagnostic tests could be performed within the organ.

Meantime the location and condition of David's blood vessels were recorded by the angiography (the X-raying of the vessels after injection of contrast material to show them).

The studies provided a road map for the third and most recent heart operation on February 10, 1976, less than two weeks before David's 11th birthday.

Dr. Mortimer J. Buckley, Jr., Chief of the MGH Cardiac Surgical Unit, closed the two holes in the patient's heart chambers, made sure that the aorta, connected to the left ventricle, was functioning properly, and removed the shunt. Then he hooked up to the right ventricle an artificial pulmonary artery and valve.

"Today David's circulation is normal," Dr. Goldblatt said. "He doesn't need the wheelchair anymore. He can play like other healthy children although he can't run as long or as fast as most of them.

"He must visit the MGH Pediatric Cardiac Ambulatory Clinic every six months for a checkup, and because he is also epileptic, he must make periodic trips to the hospital's neurology clinic. His epilepsy is controlled by medication.

"David's care at the MGH can only be described as a true team approach. Whatever his difficulty, he has been helped by the talents of some hospital unit. This is a beautiful picture of what this teaching hospital can do for a patient with multiple problems."

The principal question now is the length of time that the artificial artery and valve will function. Since patients have been receiving such devices only a relatively few years, physicians cannot be certain whether these implants will last years or a lifetime and must monitor the progress of their patients.

Meantime David does not worry about that. Each morning, a minibus picks him up and takes him to the Cotting School, a special school in the Back Bay for handicapped youngsters. Because of his medical history, public schools prefer not to enroll him.

After his 7th grade classes, the minibus returns David to his neighborhood to join friends for skateboarding, bicycling, or street hockey.

He does not lack for company at home, either. David and his mother share their seven-room duplex apartment in the Mattapan section of Boston with Mark and Kristina Shirkey, aged 14 years and 18 months respectively, plus four foster children.

Despite seven youngsters to watch over, Mrs. Shirkey finds time to participate in a swimming program held under the auspices of the Easter Seal Society to help handicapped children.

"At these Monday night sessions in the Hennigan School," she said, "the children learn to rely on themselves and develop confidence. The exercise also builds their muscles, and they have a good time. David not only takes part but helps the Easter Seal Society to stimulate public interest in the program."

The boy's helpfulness to the Society is not unlike the relationship between several other patients of Dr. Goldblatt and the Massachusetts Heart Association.

During five of the past six years, the state association has chosen its poster child from among the children cared for by Dr. Goldblatt.

In addition, various Massachusetts chapters of the state organization have honored his patients with such titles as "Prince of Hearts" or "Princess of Hearts."

David Shirkey obtains swimming instructions from Lifeguard Bob Finnerman at a Boston municipal pool while Boston Parks and Recreation Commissioner Peter G. Meade looks on.

Storing food at low temperatures will halt the growth of bacteria but will not kill the organisms.

Spoiling for a Fight With Food Poisoning

Ambulances stood by at the Copenhagen airport as a chartered commercial airliner with 343 passengers and a crew of 20 landed after a flight from Tokyo.

Nearly 200 of the passengers and one of the crew were suffering from a gastrointestinal illness characterized by diarrhea, vomiting, abdominal cramps, and nausea. Most required hospital treatment.

The outbreak was diagnosed as staphylococcal food poisoning. Investigators traced the organism to ham slices which comprised part of breakfast meals picked up for the passengers during a brief stopover in Anchorage, Alaska.

The investigation revealed that the ham was handled by a cook with an inflamed finger injury. The meat he infected was later stored at room temperature long enough for the bacteria to grow.

Because the plane's crew had boarded in Anchorage where it was dinnertime, only one of its members suffered food poisoning. Nineteen of the 20 members dined on steak. The 20th, like the passengers who were eating breakfast, had ham instead.

Although 30 of the hospitalized passengers were sufficiently ill to require intravenous fluids, everyone on the flight recovered.

During 1975, the latest period for available annual statistics, the Center for Disease Control in Atlanta, Ga., received reports of 497 foodborne disease outbreaks in the United States. A total of 18,260 people were affected. As in past years, staphylococcal infections ranked by far as the most common form of food poisoning.

The government figures, however, list only reported incidents. In reality, the number of Americans made ill each year by contaminated food is estimated to exceed two million.

The vast majority of food poisoning episodes go unreported for two reasons: (1) They quickly run their course. (2) They are unrecognized, often being mistaken for the "24-hour flu."

Cooking at high temperatures will destroy dangerous bacteria in food. The higher the temperature, the less time is required.

Certain chemicals can cause food poisoning, but in most instances when the guilty parties are identified, they are bacteria, one-celled organisms which when magnified a thousand times are still no larger than the point of a pencil.

Supplied with ample food, moisture, and heat, a bacterium cell will grow to a certain size and then split into two cells within a half hour. As two cells divide into four, and four into eight, etc., it takes only a few hours for the bacteria to produce enough poison (toxin) to cause illness.

"Usually when you hear about food poisoning, there has been a breakdown somewhere in the food handling process," said Dr. Robert H. Rubin, an MGH physician and member of the hospital's Infectious Disease Unit.

"Fortunately, most types of foodborne illnesses are of short duration. For example, toxins from staphylococcal bacteria and from another type called clostridium perfringens usually vanish after a day or two because the preformed toxins are eliminated from the body.

"Death from such illnesses is extremely rare. The patient would have to be in precarious health at the outset."

Meats, poultry, egg products, cream-filled pastries, fish, and various kinds of salads can serve as feeding grounds for the staphylococcal, or staph, germs. The clostridium perfringens bacteria thrive principally in reheated cooked meats and gravies.

Of greater concern to physicians are salmonellosis and shigellosis food poisoning. The bacteria of both can contaminate any food.

Recovery from shigellosis may take a week. Salmonellosis may persist for two weeks and may be life-threatening, particularly to infants, the aged, and patients severely ill with other diseases, especially cancer.

"We live in a sea of salmonellae, and only proper cooking practices keep us from having a higher rate of clinical illness from this organism," said Dr. Rubin, who is also an Assistant Professor of Medicine at Harvard Medical School.

In a recently published book entitled "Salmonellosis," Dr. Rubin and a co-author, Dr. Louis Weinstein, a physician at Peter Bent Brigham Hospital in Boston and an Honorary Physician at the MGH, emphasized the extent of the problem.

They cited studies involving different

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Health Officials Keep Food Handling Under Intensive Surveillance

(Concluded from Page 5)

commercially prepared foods which resulted in the discovery of salmonellae in 41.4 percent of turkeys examined in California and 50.2 percent of chickens tested in Massachusetts.

Of 1,131 commercially frozen egg whites, 20.8 percent were found contaminated by the organisms. Twenty-three percent of fresh sausage and 12.5 percent of smoked sausage bought in retail shops yielded salmonellae. An outbreak of salmonellosis affecting 23 states and seven Canadian provinces was traced to Christmas-wrapped chocolate balls.

During summer and fall, the Center for Disease Control received reports of dozens of people being stricken with salmonellosis caused by consumption of precooked roast beef.

The United States Department of Agriculture reacted by ordering processors of precooked roast beef to heat the meat to at least 145 degrees Fahrenheit, thus destroying any salmonellae that might be present.

As a result of intensive surveillance by public health officials, the most severe form of food poisoning, botulism (clostridium botulinum), is now rare. Caused by bacteria which thrive in an oxygen-free environment, botulism develops in improperly canned food.

Leftovers should not stand at room temperature. Refrigerate, or wrap, date, and freeze.

Salads should be kept chilled until just before use.

Respiratory or cardiac failure often results from ingestion of such food. At one time, the bacterial organism killed two-thirds of its victims within three to seven days. Today, despite the seriousness of the organism, modern treatment seems to be making inroads on the percentage who die.

Commercially canned foods are seldom a source of trouble today because they are prepared by methods which prevent the botulin. The main threat comes from home canning.

An estimated 1.5 million Americans who travel to Mexico each year develop a gastrointestinal illness called by various names such as "turista," "Montezuma's revenge," and "traveler's diarrhea." Researchers who have studied the disease report it is caused not by one organism but by a variety of bacteria, viruses, and parasites.

The investigators said that, among the people they studied, the poisoning arose in food, not water. One of the best protective measures that could be taken, they said, was to eat only cooked foods that had been recently prepared and held at proper food-storage temperatures.

At the same time, as a basic precaution, they advised travelers to avoid tap water in areas where the public supply was not adequately treated.

In general, to avoid food contamination, cooks and serving personnel should observe as their first rule keeping hot food hot and cold food cold. Neither should be allowed to remain at room temperature for more than two hours. Bacteria flourish at temperatures between 40 and 140 degrees Fahrenheit.

Prevention of food poisoning also depends a great deal on general hygiene and personal cleanliness. People with infections or diseases should not be permitted to prepare or serve food.

On visiting a commercial eating establishment for the first time, look around. Is the place clean? If not, chances are that conditions in the kitchen are not much better.

Frequent hand washings are the single most important precaution against cross-contamination of food.

Anesthesia: The Backbone of Surgery

The MGH houses one of the most celebrated rooms in the world.

Beneath the dome of the Bulfinch Building, the hospital's original structure, is the amphitheater where anesthesia in surgery was unveiled to mankind on October 16, 1846.

Registered as a National Historic Landmark, the room contains a plaque commemorating the event. The inscription reads, in part:

"Knowledge of this discovery spread from this room throughout the civilized world and a new era for surgery began."

Surgeons who once relied on a fast knife and the services of several strong assistants to hold down the patient could now work more slowly and methodically "to rid him of what ailed him."

The late Dr. Henry Knowles Beecher, Anesthetist-In-Chief at the MGH for 33 years, once remarked that "pain was doubtless the first reason for the development of the physician." Today's doctor is equipped with an imposing array of techniques for the suppression of pain.

"Such relief, however, is only one aspect of the anesthetist's role," said Dr. Richard J. Kitz, present head of the MGH Department of Anesthesia. "One of his principal objectives is to keep the patient alive while providing the condition for the surgeon to intervene in some disease process."

While the surgeon operates, the anesthetist monitors and controls not only the patient's unconscious state but also his heartbeat, respiration, blood pressure, neuromuscular action, and metabolism. Keeping close watch on the patient and providing precise amounts of one or more anesthetics while monitoring the vital signs requires a highly trained specialist.

(The words "anesthesia" and "anesthetist," incidentally, were coined by Dr. Oliver Wendell Holmes, an MGH physician and father of the United States Supreme Court Justice.)

Called the most important contribution to American medicine during the 19th century, anesthesia has advanced to the point where its safety rarely comes into question. Most often, the patient facing an operation chooses his surgeon and lets the hospital pick the anesthetist.

"Many American hospitals have fewer than 100 beds," Dr. Kitz said, "and often employ nurse-anesthetists, who are by and large very competent individuals.

"The Joint Commission on Accreditation of Hospitals also maintains very firm policies governing anesthesia equipment and the kinds of anesthetics that can be used in medical institutions."

At the MGH, almost all anesthetists are physicians. This specialist usually enters the surgical picture the afternoon or evening before the scheduled operation. He reviews the patient's record to see what medical or surgical attention may have been given in the past. And he also looks for any notations by the referring physician.

In a continuing effort to assess any special needs the patient may have, the anesthetist will call on him. The doctor may elect to personally reconduct part of the patient's presurgical examination.

Dr. Bucknam McPeek, an MGH anesthetist, said that when the scheduled surgery is particularly complicated or the patient's condition is very delicate, a staff member of his department might be called in several days prior to the operation.

The surgeon might also request the services of a specific anesthetist, one who has developed expertise in handling the type of difficulty that is present.

One such specialist is Dr. George E. Battit, who administers the day-to-day activities in the MGH operating rooms.

"For many years Dr. Battit has served as the anesthetist during pheochromocytoma surgery," Dr. McPeek said. "This is an operation involving unusual tumors which secrete a substance called epinephrine.

"After you put the patient to sleep, everything may seem to progress smoothly until the surgeon begins cutting. Then the patient's blood pressure shoots up. By knowing in advance what we are up against, we can take proper measures to control the sudden change."

Creating optimal conditions for the surgical team constitutes a major responsibility of the anesthetist. These conditions vary depending on the patient's size and state of health and on the procedure.

During surgery to replace a hip joint, the doctor frequently uses a special medication to drop the patient's blood pressure below normal. This prevents extensive bleeding since the operation necessarily involves severing many blood vessels. Not only is the need for blood transfusions lessened, but the surgeon's role also becomes less complex.

To operate deep within the body such as on the main artery (aorta), the stomach, or the gallbladder, a surgeon requires complete relaxation of the patient's muscles. People tend to think that if a person is asleep he must be totally relaxed. This is a misconception.

To bring about the desired state, the anesthetist might put the patient to sleep by using a general anesthetic such as halothane and then inject a

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Working in the MGH anesthesia induction room, Dr. John K. Stene, Jr., (right), assists Dr. Francis D. Harris in intubating a patient's windpipe for delivery of an anesthetic prior to an operation.

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Surgeons Rely on Expertise of Anesthetists

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muscle relaxant, the most common of which are curare, succinylcholine, and pancuronium.

Ether, the original anesthetic, possesses the dual capability of rendering a person unconscious while simultaneously producing profound relaxation. In addition to having to know when and how to use the many types of gases and muscle relaxants, the anesthetist must be familiar with the properties of a variety of other kinds of anesthetics.

At the MGH where patients often are referred for specialized care, some surgical procedures normally regarded as simple and straightforward turn out to be quite complicated, especially for the anesthetist.

A person may be admitted for repair of a hernia or removal of an appendix. If he were otherwise in good health, the problem could be dealt with easily. But what if the patient also had a serious respiratory disorder or a heart condition?

In such circumstances, any surgery could be life-threatening. Anesthesia alone could affect the ailing heart adversely. The anesthetist must be prepared for any eventuality, and his skill may be as important in pulling the patient through the procedure as even the deft hands of the surgeon.

Dr. Edward Lowenstein, Chief of the Cardiac Anesthesia Team at the MGH, is studying the specific effects that various anesthetics have on the function of the heart muscle (myocardium).

The MGH Department of Anesthesia engages in other studies to learn how its field of medicine can be improved for the benefit of the patient.

During an operation, for example, how does one know whether the patient is receiving sufficient oxygen? Sometimes disease lowers the efficiency of hemoglobin, the blood component which transports oxygen.

Dr. Myron B. Laver, Director of the MGH Acute Care Laboratory, is investigating how hemoglobin works and how it reacts to various drugs and chemical changes in the body.

Dr. McPeek is trying to sort out the factors which influence the risk of anesthesia during operations and determine how treatment can be altered to lower that risk.

Dr. Kitz, who is the Henry Isaiah Dorr Professor of Research in Anaesthesia at Harvard Medical School, predicts some excellent new anesthetic drugs will be developed in the near future at research centers like the MGH and that as a consequence more effective training programs will become available in his field.

"Many things conceived for our space program also are now spinning off into the civilian market," he said. "Among these are microcomputers which permit construction of sophisticated, yet economical, electronic equipment for anesthesia. Until recently, there had been no major advances in this area over the last quarter of a century."

Dr. Kitz concluded that "with new drugs, more sophisticated instrumentation, and educational programs that will make our professionals more knowledgeable, more skillful, and have improved judgment, we will be better able to care for sick people."

At right, Carolyn Signoretti, 3, is held by Miss Rosemary Royce, MGH Nursing Assistant, after receiving anesthetic in preparation for surgery. Below, a comforting hand continues to hold Carolyn as the drug begins to take effect.